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HERBERT FRIEDMANN, *Chairman*

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PUBLICATION NOTE

By a change in the By-Laws of the Biological Society of Washington, effective March 27, 1926, the fiscal year now begins in May, and the officers will henceforth hold office from May to May. This, however, will make no change in the volumes of the Proceedings, which will continue to coincide with the calendar year. In order to furnish desired information, the title page of the current volume and the list of newly elected officers and committees will hereafter be published soon after the annual election in May.

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The Committee on Publications declares that each paper of this volume was distributed on the date indicated on its initial page. The contents, minutes of meetings, and index for 1952 (pp. v-x, 209-220) were issued on April 15, 1953. The title page and lists of officers and committees for 1952-1953 (pp. i-iv) were issued on December 9, 1952.

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PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON

PROCEEDINGS

All meetings during 1952 were held in Room 43 of the United States National Museum.

1003d Meeting—January 22, 1952

President Dayton in the chair; 17 persons present.

New member elected: William J. Frank.

Formal Communications: D. H. Johnson, Mammals of North Borneo—some problems of distribution and epidemiology; J. W. Aldrich, Application of taxonomy of doves to hunting regulations.

1004th Meeting—February 22, 1952

President Dayton in the chair; 15 persons present.

The death of Charles E. Chambliss, a former president of the Society, was noted.

Informal Communications: S. F. Blake, Exhibition of new publication; F. C. Lincoln, Evening Grosbeaks in the Washington region.

Formal Communication: Carlton M. Herman, Rabies in animals.

1005th Meeting—March 25, 1952

President Dayton in the chair; 24 persons present.

Informal Communications: Frederick Schindler, Meteorological factors in development of the European corn borer; S. F. Blake, Observation of Evening Grosbeaks in Maryland and Virginia.

Formal Communication: G. F. Gravatt, The current situation in the serious tree diseases of the eastern United States.

1006th Meeting—April 22, 1952

President Dayton in the chair; 21 persons present:

Formal Communication: Milton Gaschk, Some aspects of agriculture in Japan.

1007th Meeting—May 27, 1952

73d ANNUAL MEETING

President Dayton in the chair; 32 persons present.

The reports of the Recording Secretary, Treasurer, and Committee on Communications were presented.

The following officers and members of Council were elected: President, W. A. Dayton; Vice presidents, H. G. Deignan, Hugh O'Neill, Herbert Friedmann, Alan Stone; Recording Secretary, S. F. Blake; Corresponding Secretary, H. W. Setzer; Treasurer, A. J. Duvall; Members of Council, D. H. Johnson, R. M. Gilmore, Howard D. Owens, Louise M. Russell, C. O. Handley, Jr.

The business meeting was followed by an open meeting, with the following communication: Romeo Mansueti, Migrations of shad and other fishes in the Potomac and adjacent rivers.

1008th Meeting—October 28, 1953

Vice-President Friedmann in the chair; 20 persons present.

New members elected: L. B. Holthuis, E. L. Puffer.

Informal Communication: S. F. Blake, Observation of American Egret in Washington in late October.

Formal Communication: F. G. Ashbrook, The biological and legal meanings of the new Federal Fur Labeling Law.

1009th Meeting—November 25, 1952

President Dayton in the chair; 26 persons present.

Informal Communication: S. F. Blake, Exhibition of new books.

Formal Communications: Ethel Dolnick, Characteristics of fur fibers and their relationship to quality of fur; Robert Duckett, Examination of hairs relating to criminal investigation.

The December meeting was cancelled.

PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON

SOME NEW AMPHIBIANS FROM GUATEMALA

BY L. C. STUART

Institute of Human Biology, University of Michigan

During the course of the past few years the writer has either personally collected or received for study from other institutions some Guatemalan amphibians which appear to be undescribed. Three of these specimens belong to the difficult genus *Oedipina* Keferstein. It is with some misgivings that they are herein assigned to two new species. Two other specimens have been in the writer's collection for some time, and, though he has recognized them as belonging to an undescribed species of *Magnadigita* Taylor, he has hesitated to record them owing to their rather poor state of preservation. Inasmuch as there seems to be little possibility that further material of the same species will be forthcoming for some time, it seems best that they be described now. A single specimen of a very distinct *Plectrohyla* Brocchi and a fine series of *Hypopachus* Keferstein both new to science were secured by the writer in 1949.

The first species to be described, an *Oedipina*, is named for its geographic locale, the slopes of Volcán Fuego. It may be known as

Oedipina ignea new species

Holotype.—United States National Museum, No. 127959. An apparently adult female collected in 1948 by Mr. Herbert Delmat along the Río Las Brisas, just south of Yepocapa, Department of Chimaltenango, Guatemala. Elevation, about 1450 meters.

Diagnosis.—An *Oedipina* very close to *O. alfaroi* Dunn from which it differs in its blue-black rather than brown coloration, its somewhat less completely webbed digits, its slightly longer legs, and its slightly longer head in comparison with its head-body length.

Description of holotype.—Body form slender. Snout blunt but not strongly so; overlapping the lower jaw only moderately. Horizontal diameter of the eye almost equal to the snout-eye distance. Loreal region not depressed. Canthus and top of snout rounded. A slight depression (possibly owing to preservation) just anterior to the eye and another to the parietal region.

A canal commencing at the posterior corner of the eye curves sharply dorsally and then extends posteriorly along the side of the head to the gular fold. Another canal that bends sharply posteriorly medially crosses the chin and connects the corners of the mouth. From this two other

canals extend forward on either side of the chin and join anteriorly. Short canals on either side of the head extend dorsally from the corners of the mouth to the lateral head canal. Two short canals extend from the nostrils down onto the upper lip.

Maxillae toothed. Vomerine teeth on low ridges that curve backwards from behind the choanae and almost join medially. A maximum of 10 vomerine teeth on each ridge (right side.) Parasphenoids (paravomerines) heavily toothed, not separated medially and extending forward almost to the vomerines. None of the premaxillary teeth pierces the lip. Sublingual fold well developed.

Nineteen costal grooves between arm and leg insertions. Thirteen costal grooves separating the arms and legs when adpressed. Digits slightly rounded; all connected by webs which do not quite extend to the tips of the most distal phalanges. Constriction at base of tail barely evident.

Color, gun-metal blue above and slightly lighter below. The nasal region and the area around the arm and leg insertions somewhat lightened. A light gland-like spot just posterior to the groin.

Snout to base of tail, 56.5 mm.; tail, incomplete; tip of snout to gular fold, 7.5 mm.; head width at angle of jaws, 4.5 mm.

While at Yepocapa in 1949 there was brought to me a fragment of an *Oedipina* obviously the same as that described above. This fragment consists of a body and four legs. It has but 18 costal grooves between arm and leg insertions and but 11.5 grooves separating the adpressed limbs. In color it resembles the type. It was collected in the mulch of a coffee grove seven kilometers by road south of Yepocapa at an elevation of 1350 meters.

It is not improbable that Guatemalan material described and figured by Brocchi¹ under the name "*Spelerpes vermicularis* Gray" is of this new species. Mr. Jean Guibé of the Museum National d'Histoire Naturelle informs me that Brocchi's material consisted of four specimens. All have 18 costal grooves and I estimate from Mr. Guibé's measurements that the adpressed legs are separated by about 10.5 costal grooves in the two larger individuals and by about 9 in the two smaller ones.

A second new species of the genus *Oedipina* I name for Dr. Edward H. Taylor of the University of Kansas whose investigations have opened up new lines of research on the difficult Mexican and Central American Pléthodontids.

Oedipina taylori new species

Holotype.—Museum of Zoology, University of Michigan, No. 102281. An adult male collected on May 28, 1949 by L. C. Stuart 4 kilometers east of Hacienda La Trinidad (23 air line kilometers southeast of Chiquimulilla), Department of Jutiapa, Guatemala. Elevation, about 100 meters.

Diagnosis.—An *Oedipina* apparently most closely allied to *O. alfaroi* Dunn from which it may be distinguished by the absence of webs between the outer phalanges of all digits except I on both the hands and feet and by a reduction in the number of vomerine teeth.

Description of holotype.—Body form slender. Snout narrowly rounded and strongly projecting over the lower jaw. Horizontal diameter of the

¹Brocchi, P., Miss. Sci. Mex., Etudes Batr., 1883: 118, Pl. 20, Fig. 1.

eye considerably less than the snout-eye distance. Loreal region depressed as is the anterior portion of the upper surface of the head. The canthus thus remains elevated and rounded.

A canal commencing in the supraocular region descends behind the eye to the eye corner and thence backwards along the side of the head to the gular fold. A short, barely visible nuchal canal extending dorsally from the gular fold. Gular fold prominent. A weak fold, curved backwards medially, connects the angles of the jaws on either side and from it a short canal extends dorsally and crosses the lateral head canal. Laterally, on either side, a canal extends forward from this weak fold to the tip of the lower jaw and these canals are joined at about the level of the eye by a weak transverse canal. Extending backwards on either side from the same weak fold are two short canals which do not quite reach the gular fold. A canal from each nostril down onto the maxillary protuberance on each side of the snout.

Upper lip pierced by two premaxillary teeth. Maxillae not toothed. Vomerine teeth on transverse ridges that curve backwards medially and lie at the level of the choanae. A maximum of five vomerine teeth (right side.) Parasphenoids (paravomerines) well toothed and extending forward to below the center of the eyes; separated medially by a narrow channel. Sublingual fold barely evident.

Twenty costal grooves between the arm and leg insertions; the most posterior groove barely indicated. Legs and arms short, separated by 15 costal grooves when adpressed. Digits rounded; the terminal phalanx on fingers II-III-IV and on toes II-III-IV free. No constriction at the base of the tail.

Color above and below, gun-metal blue. The snout, arms and legs, the cloacal region, and the area around the arm and leg insertions somewhat lighter. A light spot behind the leg insertion.

Snout to base of tail, 55 mm.; tail incomplete but originally probably several times the head-body length; head to gular fold, 7.4 mm.; head width at angles of jaws, 4.3 mm.

The holotype was collected from beneath a rotting log in an open forest. Intensive search in the immediate area failed to reveal further specimens.

In 1944 while at Jutiapa, Department of Jutiapa, Guatemala (elevation, about 900 meters) a local physician presented me with a specimen of *Oedipina* which may belong to this species. It had been preserved in very strong formalin and is in a very desiccated condition. The specimen had been collected in the rubble of a ruined *ranchito* on the outskirts of the village. Insofar as I am able to determine, the specimen, a female No. 98125 in the collections of the Museum of Zoology, University of Michigan, is identical with the holotype of *taylori* except that it possesses maxillary teeth and is dark brown in color. Because of the presence of maxillary teeth, the variability of which is but poorly understood in the genus, I do not designate this specimen a paratype, though I do refer it to *taylori* provisionally.

Inasmuch as I have but little experience with the genus *Oedipina* either in the field or in the laboratory, I have had to rely upon descriptions in the literature and upon notes supplied me by my colleagues Drs. E. R. Dunn and Edward H. Taylor. Both agree, oddly enough, that the above species are distinct. Insofar as *taylori* is concerned I am

in accord with them, but *igneae* seems to me so close to some of the forms described from southern Central America that I am not too certain it may not prove to be conspecific with one of them.

Two specimens of a salamander stemming from the Sierra de los Cuchumatanes of southwestern Guatemala prove to be a very distinct new form of *Magnadigita*. Turning again to geographic locale for a specific name, I designate them

Magnadigita omniumsanctorum new species

Holotype.—Museum of Zoology, University of Michigan, No. 102285. An adult female collected by Raymond Stadelman at Todos Santos, Department of Huehuetenango, Guatemala. Elevation, about 2500 meters. Collected probably in April of 1937.

Paratype.—Museum of Zoology, University of Michigan, No. 102286. An adult female collected with the holotype.

Diagnosis.—A *Magnadigita* obviously related to *M. morio* (Cope) from which it differs in possessing shorter legs, darker coloration both dorsally and ventrally, and possibly a few more vomerine teeth.

Description of holotype.—Body form robust. Snout narrowly rounded and relatively short. Horizontal diameter of eye almost equal to the snout-eye distance. Loreal region not depressed; canthus rounded; mouth oval in outline; greatest width of head at angle of jaws. Nostrils small; a barely visible naso-labial groove. Labial protuberances beneath nostrils distinct but only moderately developed. A well developed gular fold that appears to extend upwards onto the sides and ends on the shoulders. An ill-defined chin-groove continues dorsally onto the sides of the head behind the angle of the jaws. No other head grooves indicated.

Costal grooves well defined; 13 between the limb insertions. Digits rounded at the tips and webbed except the outer two phalanges of toes II, III, and IV and fingers II and III. Basal constriction of tail very distinct. Combined lengths of arm and leg from insertion to tip of longest digit equal to 77 per cent of the axilla-groin measurement.

Vomerine teeth irregularly arranged on ridges that extend medially and posteriorly in a sweeping curve from outside and behind the choanae; almost joining medially. Vomerine teeth about 12 on each side. A large, arrow-shaped patch of parasphenoid (paravomerine) teeth, not broken medially, and extending forward almost to the vomerine ridges. Maxillae toothed to mid-eye level. Tongue almost heart-shaped and barely one-third the width of the lower jaw.

Head length to gular fold, 14 mm.; head width at angle of jaws, 10 mm.; head-body length, 63 mm.; tail length, 43 mm.

Entire dorsal surface dark brown. Sides lighter and heavily flecked with white. Undersurfaces light brown powdered with white; the throat and chin somewhat lighter than the belly. Limbs brown, flecked with white above and marbled brown and white below.

Paratype.—The paratype is like the holotype in all essential details. It is somewhat larger, with a head-body length of 73 mm. Limbs somewhat shorter, combined lengths of limbs equal to but 70 per cent of the axilla-groin measurement. Owing to poorer preservation the teeth are more readily counted than in the holotype. Twenty-nine teeth on the maxilla, 13 vomerine teeth on each side, and 6 teeth on the premaxilla.

In the irregular arrangement of the vomerine teeth, in coloration, and in habits this species is obviously related to *Magnadigita morio*. Both are apparently ground forms in the oak-pine zone of southwestern Guatemala. *Magnadigita morio* seems to be restricted to oak forest at elevations of from about 1800 to 2500 meters on the Plateau of Guatemala. *Magnadigita omniunsanctorum*, though known only from the type locality, is probably distributed throughout the Sierra de los Cuchumatanes to the north of the Plateau. The types were secured from beneath a log in a corn field.

My studies on Guatemalan species of the genus *Magnadigita* lead me to believe that the genus may be broken down into at least three groups. One, which in previous publications I have referred to as the *dunni* group, includes a number of small species. They are all characterized as having flattened rostra which, when viewed from above, are almost straight across between the nostrils. The eyes are large and protruding, a single phalanx of the longest toe is free of a web, and in color they are all streaked and striped with shades of brown and red. All, insofar as is known, are bromeliad inhabitants at intermediate elevations (1500-2500 meters.) Species of the *morio* group are robust forms of moderate size and with rounded rostra. The eyes are smaller than in species of the *dunni* group and are less protruding. Two phalanges of the longest toe are free from the web, and the vomerine teeth are irregular in arrangement, often approaching an echelon type of arrangement. They are mottled brown and white and flecked with white. They are ground forms. A third group may be designated the *franklini* group. These species are also robust and of moderate size though larger than those of the *morio* group. In this group the snout is rounded, the eyes are of moderate size, two phalanges of the longest toe are free from the web, and the vomerine teeth are regularly arranged on the bone. All species are brightly colored with shades of red and yellow and are either spotted or possess a distinct dorsal stripe. They are bromeliad forms.

Insofar as I have had experience with the various species, I would suggest the following arrangement:

dunni group

dunni, *engelhardti*, *cuchumatana*, and *helmrichi*. I do not know *robusta*, *subpalmata*, or *macrinii*, but from descriptions I believe that they may be placed in this group. Here also may be placed *adpersa* though it is said to lack a prefrontal bone.

franklini group

franklini, *lincolni*, and *nigroflavescens*. I believe that Taylor² should have compared the last with *franklini* rather than *engelhardti*.

morio group, *morio* and *omniunsanctorum*.

Two other species with which I am familiar do not fit into this scheme in all details. *Magnadigita rostrata* is morphologically like members of the *dunni* group, but differs in habits, being confined to high elevations (above 2800 meters) and living beneath logs rather than in bromeliads. It is possible that the absence or sparsity of bromeliads at such elevations may have forced the species to retain its terrestrial habits. Only in the Cuchumatán Mountains does it overlap the range of any other

²Taylor, Edward H., New Amphibians from the Hobart M. Smith Mexican Collections, Univ. Kansas Science Bull., 27, 1941: 150-152, Pl. 8, Pl. 9, Figs. 9-10.

species of the *dunni* group and even there it occurs well above the upper limits of *cuchumatana*. I am inclined to place it in the *dunni* group.

Magnadigita flavimembris is certainly very like species of the *franklini* group. Taylor,³ however, has pointed out that it possesses a type of hand and foot unlike other members of the entire genus. Furthermore it is terrestrial rather than a bromeliad inhabitant, and, though geographically coincident with *franklini*, it is ecologically distinct. It may be assigned to the *franklini* group provisionally.

It should be noted that the above arrangement is merely a suggestion based upon a rather superficial consideration of the genus. It is presented at this time merely because it is felt that it may be of some value to other investigators working with the genus but lacking material from Guatemala where *Magnadigita* appears to be centered and may, indeed, have originated.

To the growing list of species assigned to the hylid genus *Plectrohyla* I add, with apologies, yet another. It may be called

Plectrohyla avia new species

Holotype.—Museum of Zoology, University of Michigan, No. 102280. An adult male collected in scrubby second-growth on April 21, 1949 by L. C. Stuart at Granaja Lorena (about 10 air-line kilometers northwest of Colomba), Department of Quezaltenango, Guatemala. Elevation, about 1750 meters.

Diagnosis.—A *Plectrohyla* of spectacularly large size with a simple prepollex, lacking vocal slits, and with a visible tympanum. Differing from its apparently closest relative, *Plectrohyla cotzicensis*, in lacking an outer metatarsal fold.

Description of holotype.—Teeth on maxillae and premaxilla stout, 46 in number; vomerine teeth on two elevated mounds between choanae and somewhat closer together than their distance from the choanae. Tongue very large, almost filling the lower jaw, oval in outline and rounded behind.

Head short, broader than long. Rostrum not pointed nor with a keel. Canthus almost fold-like, producing a marked depression in the loreal region. Nostrils almost terminal and slightly elevated above surrounding snout surface. Tympanum small but very distinct, its horizontal diameter slightly less than the horizontal diameter of the eye. A heavy, glandular supratympanic fold that continues forward above the eye and merges with the fold-like canthus.

Skin on the upper surface of the head and hands, finely tuberculate; skin of remaining upper surfaces, smooth. Arms strongly developed, lacking either fold or row of tubercles on the fore-arm. Digit I with a simple, horny prepollex. Palmar tubercles conspicuous but compared with other members of the genus only moderately developed. A trace of a web between the fingers. Terminal disks of fingers well developed and considerably larger than the tympanum. Belly coarsely granular; chest smooth, with an indication of a transverse fold. Chin almost smooth with but a few scattered granules.

Legs normally developed. A low, poorly developed inner metatarsal ridge; no outer metatarsal ridge. Foot tubercles conspicuous but not

³Taylor, Edward H., The Genera of Plethodont Salamanders in Mexico, Pt. I. Univ. Kansas Science Bull., 30, 1944: Pl. 14, Fig. 8.

overly developed. Under surface of thighs coarsely tuberculate as is the anal region. No trace of an anal flap or enlarged subanal tubercles.

Webbing on the toes difficult of description owing to the presence of a lateral dermal fringe on the toes with which the web merges. Digit I webbed to the tip on its outer side; digit II with one phalanx free on its inner side and webbed to the tip on its outer side; digit III with one phalanx free on its inner side and with one-half phalanx free on its outer side; digit IV with one phalanx free on both sides; digit V webbed to the tip on its inner side.

Color above, blue-gray with no trace of pattern; undersurfaces immaculate, varying from dirty yellow to greenish white.

Head-body length, 86 mm.; head width at angle of jaws, 30 mm.; tip of snout to angle of jaw, 25 mm.; tip to snout to eye, 7 mm.; anus to heel, 76 mm.; heel to tip of digit IV, 66 mm.

In lacking vocal slits this species agrees with both *Plectrohyla guatemalensis* Brocchi and *P. cotzicensis* Stuart. This character may be an indication of phylogenetic relationship between the three species. At the same time associated with these three species there have always been found tadpoles of "x" type of Stuart.⁴ Though it can not be proven that tadpoles of this type secured in the streams at Lorena belong to *P. avia*, the observation is suggestive. In the same streams tadpoles of *P. sagorum* were abundant and adults of the species were not uncommon in bromeliads.

During a brief visit to Dueñas, a locality made famous by Godman and Salvin, I secured in the summer of 1949 specimens of a species of *Hypopachus* which I have been unable to allocate. For Volcán Agua which dominates the Antigua Basin in which Dueñas is situated I name this apparently new form

Hypopachus aquae new species

Holotype.—Museum of Zoology, University of Michigan, No. 102282. An adult male collected on July 21, 1949 by L. C. Stuart in the coffee groves of Finca San Rafael on the outskirts of Dueñas, Department of Sacatepequez, Guatemala. Elevation, about 1475 meters.

Paratypes.—Museum of Zoology, University of Michigan, Nos. 102283-4 (34 specimens) all collected in the same general vicinity of the holotype on the same day or during the course of the previous day.

Diagnosis.—A *Hypopachus* of the *inguinalis* group (rounded outer metatarsal tubercle), readily distinguished from *simus*, *inguinalis*, and *barberi* by the greatly reduced webbing between its toes and from *globulosus*, apparently its closest relative, by its longer leg, (coccyx to heel 87-96 per cent of head-body length in *aquae*, 82 per cent in the type of *globulosus*) bolder ventral pattern, and wartier dorsum.

Description of holotype.—Snout narrowly rounded rather than truncate; slightly longer than the horizontal diameter of the eye. Canthus rounded; loreal region very slightly concave. Interorbital distance equal to the length of the eye-lid. Fingers free; comparative lengths, III-IV-II-I. Subarticular tubercles prominent; three low palmar tubercles. Toes with just a trace of a web; comparative lengths, IV-III-V-II-I. Sub-

⁴Stuart, L. C., Descriptions of Two New Species of *Plectrohyla* Brocchi with Comments on Several Forms of Tadpoles. Occ. Pap. Mus. Zool., Univ. Michigan, 455, 1942: 8-9, Figs. 1-2.

articular tubercles of toes less prominent than those of fingers. Two metatarsal tubercles, the inner slightly compressed, the outer rounded. The former not strongly developed as in some species (*simus* especially.) Heels failing to meet when legs are adpressed posteriorly. Skin leathery, smooth beneath and somewhat warty above. A deep groove extending from the posterior corner of the eye downwards and backwards to the arm insertion. This groove gives the impression of the presence of a glandular ridge just below it. A faint canal extending across the throat just behind the angle of the jaws gives the illusion of a gular fold. Another such canal across the chest between the arm insertions marks the position of a chest fold which is present in many of the paratypes. An inconspicuous fold across the head just behind the eyes. Tongue rounded, almost filling the jaws. Vocal slits on either side at the edge of the tongue and just behind the angle of the jaws.

Snout to tip of coccyx, 30.8 mm.; tip of snout to interocular fold, 5.0 mm.; eye to tip of snout, 3.3 mm.; horizontal diameter of eye, 2.7 mm.; tip of snout to gular canal, 5.9 mm.; tip of snout to canal marking position of chest fold, 11.6 mm.; tip of coccyx to outer metatarsal tubercle, 27.1 mm.; outer metatarsal tubercle to tip of toe IV, 15.0 mm.

In spirits the ground color of the dorsum is grayish brown. A darker dorsal area with irregular black borders commences at the snout and expands posteriorly and laterally to the groin. Warts within this area quite dark, producing a blotched appearance. A narrow, diffused, light line extending middorsally from the snout to the anus. A broad light streak below the lateral head canal extends from the posterior corner of the eye to the angles of the jaws. Above this on either side is a dark, subtriangular spot mottled gray-brown and black that extends from the posterior corner of the eye to the arm insertions. Arms somewhat lighter than dorsal ground color with black spots on the upper surface of the upper arms and with dark mottlings on the upper surface of the lower arms and hands. Ground color of legs like that of dorsum. Two black bars across mid-thighs which when the legs are adpressed fall in line with two similar bars on the lower legs and with two black spots, one on the tarsus and the other on the upper surface of the foot. Dark fleckings with no regular arrangement on the sides and upper surfaces of the legs. Under surfaces of the arms, legs, and belly a dirty white with broad, bold, black reticulations. Chest, throat, and chin, white with fine, black reticulations which give them a speckled appearance.

The paratypes are like the holotype in all essential details. In some individuals a pair of very fine, light lines are discernible, extending from the anus dorsally and then laterally onto the legs to the under side of the knee. In the majority there is also a trace of a fine, light line mid-ventrally from the tip of the lower jaw onto the chest but disappearing before reaching the belly. In occasional specimens there is another faint, light line on either side, commencing at the midventral line on the chest and extending laterally to the arm insertions. In all, the very bold, ventral reticulations are characteristic, and the throat of all but one or two show the fine, dark reticulations present in the holotype. This last feature is unique in the *inguinalis* group except in occasional specimens of other species.

Collected in the mulch of coffee groves in late July, this species had apparently completed its breeding activities. In pools in an adjacent

swampy meadow tadpoles in stages varying from extremely young ones to those in which the fore-legs were about ready to appear externally were abundant.

Acknowledgements.—For aid and advice accorded me during my course of studying the above material I wish to express my thanks to Dr. Edward H. Taylor of the University of Kansas, Dr. E. R. Dunn of Haverford College, and to Drs. Norman E. Hartweg and Charles F. Walker of the University of Michigan. I am indebted to the authorities of the United States National Museum, especially Dr. Doris Cochran, for permission to describe *Oedipina ignea*. My field studies were made possible through grants from the Horace H. Rackham School of Graduate Studies, University of Michigan.

PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON

TWO NEW RACES OF BIRDS FROM THE UPPER MAGDALENA
VALLEY OF COLOMBIA

BY ALDEN H. MILLER

Museum of Vertebrate Zoology, University of California

Further field work in the arid upper Magdalena Valley of Colombia has augmented the collection of birds from that area reported on earlier (Miller, Auk, 64:351-381, 1947) and has made it possible to clear up the racial taxonomy of several forms. Two additional species are shown to have endemic races in this valley which merit description at this time.

Tiaris bicolor is a species of grassquit that occurs chiefly in the West Indies and on the Caribbean shore of South America. But it also extends south in Colombia along the Magdalena River valley where Stone (Proc. Acad. Nat. Sci. Phila., 1899: 307) recorded it from Ibague and Chapman (Bull. Amer. Mus. Nat. Hist., 36:560-561, 1917) reported it from Honda and Chicoral. The last station and Villavieja, whence I have obtained specimens, lie in the arid basin proper, whereas Honda is in a narrow part of the valley farther north where conditions are less notably arid. It is not unexpected, therefore, that these southernmost examples of the species show a paler gray green coloration than samples from more moist climatic regions. Some aspects of this color difference may be what led Chapman to comment on a degree of resemblance of his specimens to *Tiaris bicolor marchii* while nevertheless classifying them as *T. b. omissa*.

Males of this species show age variation in the development of the black face, throat and breast. Often accompanying the extension of the black in adults the green of the back and sides becomes darker or sootier. Evidently there also is geographic variation in the maximum extent of black attained. However difficult to evaluate this may be at some points in the range of the species, there is the possibility of comparing males with similar development of black and noting the differences in grays and greens of the other parts of the plumage, differences that are evidently geographic.

After reviewing all the material of the species in the Ameri-

can Museum of Natural History, I am in agreement with Hellmayr (Cat. Birds Amer., pt. 11:125, 1938) that birds of Porto Rico, the Lesser Antilles, Tobago, and Venezuela are inseparable and should all be grouped as *T. b. omissa* (type locality Tobago). There is a faint indication of a lighter colored and grayer abdominal area in the birds from Grenada and St. Vincent which Noble described as *T. b. inexpectata* but there is not enough difference to warrant separation. The contrast with typical *omissa* is not nearly as great as that of the birds of the upper Magdalena basin.

In pallor of flanks, the Magdalena birds equal *tortugensis*, the pale extreme of the species; *tortugensis* is even grayer and lighter on the back, however. *Sharpei* from the islands of Aruba, Curaçao and Bonaire is like the Magdalena birds dorsally but is not as light gray on the flanks and belly. Intervening between these insular forms, *tortugensis* and *sharpei*, is of course the coastal population of *omissa* in Venezuela. I have seen only two examples of *omissa* from Colombia apart from those of the upper Magdalena and Bogotá regions. These are from "Jimenez, W. Colombia" [=Jemenez in Valle?] and are dark gray and normal for that race. Evidently the upper Magdalena birds are related to the adjoining *omissa* and merely parallel in certain respects *tortugensis* and *sharpei*. They are not like *marchii*, as now understood, which has a sharply defined and anteriorly restricted black area in all mature males and darker and greener flanks and yellower belly. *T. b. johnstonei* and *T. b. bicolor* are forms with more extremely black males and do not at all closely resemble Colombian material, nor does the large *T. b. grandior*.

The birds of the upper Magdalena Valley may therefore be named

***Tiaris bicolor huilae* new subspecies**

Type.—Adult male, no. 120685 Mus. Vert. Zool., taken 5 kilometers north of Villavieja, 1400 feet, Huila, Colombia, on February 27, 1949, by A. H. Miller; weight 12.7 gm., testis 3 mm. long, original no. 7333.

Diagnosis.—Differs from *T. b. omissa*, its only adjacent geographic relative, in much lighter gray flanks of males, with less greenish admixture; back almost always lighter, more grayish green in males of comparable development of black

breast. Females paler and grayer green on flanks than in *omissa*. Size similar.

Range.—Tropical Zone of upper Magdalena Valley in states of Tolima and Huila, Colombia.

Specimens of T. b. huilae examined.—Ten. Huila (Mus. Vert. Zool.): Villavieja (1 ad. ♂); 5 km. N Villavieja (2 ad. ♂ ♂, 1 im. but black ♂, 1 im. ♂, 1 im. ♀). Tolima (Amer. Mus. Nat. Hist.): Chicoral (2 black ♂ ♂; Honda 1 black ♂, 1 ♀).

The birds from Honda and Chicoral are not as extreme in their gray coloration as those from Huila. One from each of these more northern stations is somewhat intermediate toward *omissa*. In addition to the specimens of known locality are 6 Bogotá skins examined at the American Museum, one of which, number 515260, equals *huilae* in pallor and probably came from the upper Magdalena Valley. Three of the others are dark *omissa* and presumably came from north or east of Bogotá.

Grassquits were evidently breeding in the vicinity of Villavieja in January, February and March, as all black males taken had testes 3 to 7 mm. in length and some were singing. They occurred in open thorn scrub where there was some grass intermixed, chiefly on mesas away from the river bottom.

Zimmer (Amer. Mus. Novit. No. 1428:53-59, 1949) has recently reviewed the Buff-tailed Warblers, *Basileuterus fulvicauda*, of Colombia. He pointed out that two races are recognizable, *semicervinus* and *fulvicauda*, the former with greatly reduced dark areas on the outermost rectrices and more contrasting, though narrower, dark band on the remaining rectrices and darker coloration generally on the body compared with the latter. Birds from east of the eastern Andes are *fulvicauda*; those west of this range are *semicervinus* with more extreme development of dark coloration on the West Coast. He also comments (p. 55) on a specimen from Tolima, as follows: "A single example from Chicoral . . . is at the lightest extreme [of *semicervinus*] and in addition has the under parts as pale as many *fulvicauda*, to which form the specimen has previously been assigned. The tail . . . shows the characteristic markings of *semicervinus*, and unless a new form is to be established for the eastern population [of *semicervinus*] assign-

ment to *semicervinus* is indicated. The Chicoral bird may be but an exceptionally pale example of the population resident in the area, and I am unwilling to attempt a description of a possible new form hereabouts on the basis of 'Bogotá skins' or without a series from the upper Magdalena." Chapman (*op. cit.*: 553) also noted the paleness of the Chicoral bird and thought it might be new.

Two specimens of Buff-tailed Warbler taken near Coyaima, Tolima, about 60 kilometers southwest of Chicoral, increase the significance of the Chicoral specimen (no. 113263 Amer. Mus. Nat. Hist.) and substantiate its differences. Thus the Chicoral bird is seen not to be "an exceptionally pale individual" for its population because it is matched, or indeed is exceeded, in this regard by an adult male in fresh plumage from this second locality. Apparently birds of the upper Magdalena Valley show the extreme aspects of tail pattern of *semicervinus* but have developed a paler whiter under surface than either *semicervinus* or *fulvicauda* and are as light dorsally as *fulvicauda*. The Chicoral bird and the Coyaima adult have been directly compared with good series of the adjoining races at the American Museum and are found to contrast consistently with them in the combination of tail pattern and body coloration. The second specimen from Coyaima, a juvenile, has tail pattern and tail color identical with the adults. Accordingly, there now seems to be grounds for naming the form of this warbler from the upper Magdalena basin. It may be known as

***Basileuterus fulvicauda motacilla* new subspecies**

Type.—Adult male, no. 120648 Mus. Vert. Zool., taken 14 kilometers west of Coyaima, 1500 feet, Tolima Colombia, on January 28, 1949, by A. H. Miller; testis 5 mm. long, original no. 7038.

Diagnosis.—Similar to *B. f. semicervinus*, and identical with it in tail pattern, but lighter green dorsally and underparts less ochraceous, much more whitish; light areas of tail paler, more yellow. Similar to *B. f. fulvicauda* but tail with outer rectrices lacking dark bands or large spots and underparts whiter.

Range.—Tropical Zone of upper Magdalena Valley in states of Tolima and Huila, Colombia.

Specimens of B. f. motacilla examined.—Tolima: Chicoral

(1); 14 km. W Coyaima (1 ad. ♂, 1 juv. ♂). Also seen near the town of Colombia, 2500 feet, Huila.

Buff-tailed Warblers in the Magdalena basin were seen only in vegetation bordering streams or ditches where they stayed within a few feet of the ground, chiefly in the shadows. They continually move the tail or the entire hind quarters as do wagtails and water-thrushes. The consequent movement of the light tawny tail makes a spectacular signal which can be seen in the shadows when the bird otherwise is scarcely discernible. This apparent use of the tail marking for recognition or attracting attention suggests the possibility that there may be important differences in behavior in the related form *Basileuterus rivularis* which lacks the light tail patch. This consideration makes me reluctant to follow Zimmer's suggestion (*op. cit.*: 57) that *rivularis* and *fulvicauda* are conspecific until intergradation is clearly demonstrated.

Grateful acknowledgment is made of the support of field work in 1949 in Colombia by the Associates in Tropical Biogeography of the University of California and of generous aid rendered by the Servicio Geologico Nacional de Colombia through Dr. Roberto Sarmiento and Diego Henao and by the Instituto de Ciencias Naturales de la Universidad Nacional de Colombia through Dr. Armando Dugand and Jose Borrero. For opportunity to compare specimens with critical material in the American Museum of Natural History I am indebted to Dr. John T. Zimmer.

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PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON

A NEW SUBSPECIES OF PYGMY MOUSE, *BAIOMYS MUSCULUS*,
FROM MORELOS, MEXICO*

BY ROBERT J. RUSSELL

In field studies carried on in Morelos, Mexico, by the Wildlife Management Department, Agricultural and Mechanical College of Texas, a series of 26 specimens of the species *Baiomys musculus* was collected. Morelos is included in the rather wide range assigned to the subspecies *Baiomys musculus* by W. H. Osgood (Revision of the Mice of the American Genus *Peromyscus*, North Amer. Fauna No. 28, 1909). Our series, however, differs significantly from *B. m. musculus* and other described races, and represents a hitherto unrecognized subspecies.

Baiomys musculus pallidus new subspecies

Type.—Adult female, skin and skull, No. 4501, Texas Cooperative Wildlife Collection; 12 km. NW. Axochiapan, elevation 3500 feet, Morelos, Mexico; July 28, 1950; collected by W. B. Davis, original number 5112.

Range.—Known only from the state of Morelos. Probably occurs throughout the Balsas Basin; specimens from Chilpancingo, Guerrero, show intergradation with *Baiomys m. musculus*.

Diagnosis.—Size small (see measurements); hind foot short; color a pale grayish; underparts whitish; feet white, with a line of grayish hairs along inner side; tail indistinctly bicolored, brownish above, whitish below, becoming darker toward tip; skull short and shallow; brain case flattened; zygoma narrowing anteriorly, narrow in breadth; rostrum sharply depressed anteriorly, wide, short, and strongly tapering; maxillary tooth row short; nasals moderately short; interparietals wide.

Comparisons.—From specimens of *Baiomys musculus musculus*, Rio Aguacatillo, 30 km. N. Acapulco, *pallidus* differs in: smaller size (averaging 11.2 grams compared with 14.2 grams); shorter hind foot (15 mm. compared with 16.5 mm.); upperparts pale grayish as opposed to the brighter brownish of *musculus*; underparts whitish instead of buff; underside of tail lighter; skull shorter (20.1 mm. compared with 21.0 mm.); zygoma narrowing noticeably anteriorly and narrower in breadth (10.7 mm. compared with 11.5 mm.); brain case flattened; cranial depth shallower (6.7 mm. compared with 7.1 mm.); rostrum sharply depressed anteriorly and strongly tapered laterally; maxillary tooth row shorter (3.0 mm. compared with 3.2 mm.).

*Contribution from the Department of Wildlife Management, Agricultural and Mechanical College of Texas.

Compared with *B. m. brunneus*, Plan del Rio, Veracruz, *pallidus* differs as follows: Smaller size (males 11.4 grams compared with 13.2 grams); pale grayish in color, as opposed to the dark brownish of *brunneus*; nasals longer (7.7 mm. compared with 7.0 mm.); interparietals broader (7.7 mm. compared with 7.0 mm.) and longer (2.0 mm. compared with 1.5 mm.).

Close comparison with *B. m. nigrescens* is not necessary. According to Osgood's description of *nigrescens* (1909), *pallidus* differs in lighter color, wider interorbital constriction (3.7 mm. compared with 3.4 mm.), and wider interparietals (7.7 mm. compared with 6.4).

Remarks.—Among the previously described subspecies of *Baiomys musculus*, *pallidus* more closely approaches *musculus* which occurs to the west. But *musculus* is a larger darker animal; with a larger skull, deeper brain case, and more widely spreading zygoma. The molar teeth are larger. The rostrum is longer, narrower, and only slightly tapered as compared with *pallidus*.

This newly described race, *pallidus*, inhabits the eastern section of the range formerly assigned to *musculus* in the arid semi-desert Balsas Basin. Specimens from Chilpancingo, Guerrero, are pale in color and match *B. m. pallidus* in weight. However, cranial and external measurements are comparable to those of *B. m. musculus*. Specimens from Chilpancingo can be regarded as intergrades between *pallidus* and *musculus*.

Measurements.—The type specimen, as follows: Total length, 120 mm.; length tail, 49 mm.; length hind foot, 15 mm.; greatest length skull 20.1 mm.; basilar length, 15.0 mm.; zygomatic breadth, 10.7 mm.; length nasals, 7.7 mm.; shelf of bony palate, 2.9 mm.; palatine slits, 4.1 mm.; diastema, 4.9 mm.; post palatal length, 7.2 mm.; length maxillary tooth row, 3.0 mm.; interparietal breadth, 7.7 mm.; length interparietal, 2.0 mm.; interorbital constriction, 3.7 mm.; cranial depth, 6.7 mm.; weight, 10.5 grams. The averages of 5 females and 5 males from Morelos are respectively: 117 (120.8); 46.4 (45.8); 15.0 (15.0); 19.9 (20.0); 15.0 (15.1); 10.4 (10.5); 7.6 (7.7); 2.9 (2.8); 4.2 (4.4); 4.8 (4.8); 7.2 (7.4); 3.0 (3.1); 7.8 (7.6); 2.1 (2.3); 3.7 (3.7) 6.7 (6.7); weight, 10.9 (11.4).

Specimens examined.—From Morelos, 26, as follows: Axochiapan, type locality, 5; Jonacatepec, 9; Yautepec, 1; Alpuyeca, 2; Tepoztlan, 9.

PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON

A NEW SUBSPECIES OF PYGMY RICE RAT (*ORYZOMYS
FULVESCENS*) FROM CHIAPAS, MÉXICO

BY EMMET T. HOOPER

University of Michigan Museum of Zoology

In his review of the species *Oryzomys fulvescens* Goldman (N. Amer. Fauna, 43, 1918) treated all samples from Chiapas, México, under the name *O. f. fulvescens*. Apparently his specimens from Chiapas were essentially like those from the state of Veracruz, in which is located the type locality of *O. f. fulvescens*. An analysis of variation in the samples contained in the University of Michigan Museum of Zoology yields a different picture of geographic variation in the species in extreme southern Mexico. Three geographic races apparently are represented in the series before me: (1) A sample of 11 specimens from Bochil and one specimen from Las Margaritas, Chiapas, are to me indistinguishable from specimens of *O. f. fulvescens* from Molango, Hidalgo, and Huauchinango, Puebla. (2) Samples from the Río de Chiapa Valley and tributary valleys are unlike both those from the mountainous region to the north (Bochil and Las Margaritas) and those from the Pacific lowlands to the south. The specimens from localities in those interior valleys (Cintalapa, Villa Flores and Prusia) are paler dorsally and ventrally. The buffy bands of the hairs are paler and slightly less ochraceous. The underparts tend to be whitish or Pale Pinkish Buff, as compared with Light Pinkish Cinnamon or Cinnamon in *fulvescens*. Eighty per cent of 88 specimens from Villa Flores, Cintalapa and Prusia are darker than 80 per cent of 17 specimens from Bochil, Hidalgo and Puebla. In coloration those 88 specimens resemble specimens of *lenis* from Jalisco and Nayarit more than they do those from Bochil, Hidalgo and Puebla. It seems probable that the range of *lenis* extends southward from southern Nayarit to the Isthmus of Tehuantepec, thence inland in Chiapas at least to Villa Flores and Prusia. (3) Samples from the Pacific lowlands are unique. There is reason for inferring that they represent another race, heretofore undescribed.

Oryzomys fulvescens pacificus, new subspecies

Holotype.—Male (molar teeth slightly worn), skin and skull; Univ.

Mich. Mus. Zool. No. 96764; México, Chiapas, Mapastepec, 150 feet elevation; collected 7 November 1949 by Helmuth O. Wagner; original No. 5384.

Distribution.—Pacific coastal lowlands of Chiapas and probably of western Guatemala. Known geographic range from Arriaga southeast to Mapastepec. Known vertical range from approximately 50 feet at Pijijiapan to approximately 300 feet at Arriaga.

Characters and Comparisons.—A geographic race of *Oryzomys fulvescens* characterized by short, monocolored tail, dark ochraceous-buffy upper parts and light buffy underparts. Coloration similar to that of *O. f. fulvescens*; underparts perhaps slightly paler. Tail scarcely or not at all paler ventrally than dorsally (bicolor in *fulvescens*) and absolutely and relatively shorter (the mean tail length and its standard error of the sample of *pacificus* from Mapastepec is 97.0 ± 1.9 mm., compared with 113 ± 1.8 mm. in the sample of *fulvescens* from Bochil). Upper parts darker, the buffy hue more ochraceous than in *lenis*; tail monocolored and shorter (averaging 121 per cent of head and body length in the sample of *pacificus* from Mapastepec and 137 per cent in a series of *lenis* from Jalisco and Nayarit). To judge from the one specimen of *mayensis* at hand and from Goldman's description of that race (N. Amer. Fauna, 43: 92, 1918) *pacificus* differs from *mayensis* in much the same way as it contrasts with *lenis*, namely in paler coloration and monocolored and shorter tail.

Color.—Upper parts Ochraceous-Tawny, darkened on back by numerous black guard hairs. A Cinnamon lateral line. Underparts varying from whitish to Light Pinkish Cinnamon, the mean of the specimens at hand near Pale Pinkish Cinnamon. Hairs of body Blackish Plumbeous basally except on throat where they are white throughout. Muzzle dusky. Ears Fuscous-Black distally, Fuscous basally. Pre-auricular tuft Ochraceous-Tawny. Upper surfaces of forefeet and hind feet white. Tail Fuscous all around.

Measurements.—Averages and extremes in mm. of 11 adults from Mapastepec: total length, 178 (155-190); tail, 97 (86-105); hind foot, 21 (20-23); ear from notch (fresh), 13 (11-14); greatest length of skull, 22.0 (20.7-23.0); zygomatic breadth, 11.4 (10.8-12.1); breadth of brain case (measured dorsal to the zygomatic processes of the squamosal), 9.9 (9.6-10.2); breadth of rostrum (measured on capsules anterior to zygomatic plate), 4.3 (4.0-4.7); length of rostrum (from superior, inner border of zygomatic arch to tip of nasal on same side of skull), 7.2 (6.6-7.7); length of palate, 3.4 (3.3-3.6); alveolar length of molar row, 3.1 (2.9-3.3).

Remarks.—If the data at hand are correctly interpreted, the racial picture of *Oryzomys fulvescens* in Chiapas is as follows: *O. f. fulvescens* inhabits the Atlantic slopes of central Chiapas at least as far south as Las Margaritas (about 15 miles east of Comitán). It is characterized by dark ochraceous upper parts and underparts and long, bicolored tail. A paler, longtailed form that is similar to if not identical with *O. f. lenis* ranges in the semi-arid valleys in the central part of the state, across the southern part (at least) of the Isthmus of Tehuantepec, thence northward on the Pacific lowlands. If it is identical with *lenis*, its northern limit, as indicated by specimens at hand, lies in the vicinity of Ixtlán del Río and Santa Isabel, southern Nayarit. *O. f. pacificus*,

characterized by light buffy underparts and short, monicolor tail, inhabits the humid coastal lowlands of southern Chiapas and probably of adjoining parts of Guatemala. Specimens of *Oryzomys fulvescens* from Hacienda California, Guatemala, erroneously listed by Goodwin (Bull. Amer. Mus. Nat. Hist., 68: 35, 1934) under the name *Reithrodontomys fulvescens*, have the short tail of *O. f. pacificus*. The three races, *fulvescens*, *lenis*, and *pacificus* are distinguished on characters of coloration and size. If their crania differ significantly, those differences are not apparent in the samples at hand.

Specimens examined.—Twenty-two from the following localities in Chiapas, México: Arriaga, 300 ft., 1; Mapastepec, 150 ft., 17; Pijijiapan, 50 ft., 4.

PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON

NEW AND LITTLE KNOWN PHILIPPINE TRIGLIDS

BY ALBERT W. HERRE AND DON E. KAUFFMAN

The Triglidae described in this paper were collected by the junior author while a member of the Philippine Fishery Program.

Two new species and one previously known from the East Indies and Indian Ocean, but new to the Philippines, are here presented. A fourth species has been collected but once previously. No doubt a study of the trawl catches of Manila Bay and the China Sea immediately outside will reveal more additions to the Philippine fish fauna.

All lengths given are of the standard length. All specimens herein mentioned are in the collection of the School of Fisheries, University of Washington, Seattle, Washington.

Otohime tagala Herre and Kauffman, new species

Dorsal VII-10 or 11; one specimen has a very minute eighth dorsal spine. Anal I-10 or 11; pectoral usually I-11-I, plus 3 detached rays, but may be I-10 to 12-I or II, plus 3 detached rays; ventral I-5. Ten bony shields on each side of the first dorsal, the 2 anterior ones forming a bony buckler around and before the base of the first dorsal spine and separated from the bony occipital plate by a crescent shaped area of naked skin; everywhere else the body is covered with scales, including the pectoral base and preventral area; for an exception see the end of this description. Lateral line tubules 55 or 56, plus 4 more on the caudal base; from 84 to 92 but usually about 86 transverse rows of scales counted immediately above the lateral line; 10 scales between the lateral line and the second dorsal origin. Gill rakers 0 or 1, plus 10 or 12 on the lower arch, the last 2 or 3 rudimentary.

The head and body are laterally compressed, moderately elongate, wedge-shaped, little elevated, the depth 3.85 to 4, the large bone-encased head 2.5 to 2.6, the deeply lunate caudal 3.4 to 3.8, the pectoral 2.2 to 2.4, the longest detached pectoral ray (usually the uppermost) 1.9 to 2, the ventral 3.5 to 3.8 times in the length. The large circular eye equals the snout, 3 to 3.1 in the head, its prominent bony rim smooth; the smooth concave interorbital equals or nearly equals the eye. The short rostral spines are sharp, slender, their outer edges very finely denticulate, 7.25 to 9 times in the head, or 2.4 to 3 times in the eye; the distance between their divergent tips 4.5 to 5.3 times in the head. The mouth is small, the maxillary equal to the eye, extending to a vertical from the front margin of the eye, or slightly beyond. The vomer is toothless, or old specimens may have a few minute teeth; palatines toothless.

No spines about the eye, nostrils, or preorbital. The conspicuous nuchal spine is usually short, sharp, usually reaching to a vertical from the base of the second dorsal spine, but sometimes not reaching the dorsal origin, 1.1 to 1.5 in eye. Opercular spine very long, sharp, and slender, extending to a vertical from the base of the fourth to sixth dorsal spine or beyond, 1.8 to 2.7 times in the head. Two pre-opercular spines, the upper one sharp and distinct, with a small and inconspicuous one just below it; the humeral plate with a small to very small flat spine, 2.5 to 3.5 times in the eye, or 7.75 to 10 in the head.

First dorsal spines slender with very sharp tips, the first spine 2.1 to 3, the third spine 1.7 to 1.8 times in the head; when depressed the fin reaches or nearly reaches the second dorsal; the rounded tip of the elongate pectoral extends to a vertical from the base of the fifth to the seventh anal ray; the longest detached pectoral ray extends opposite the base of the seventh to the last anal or second dorsal ray; the ventrals extend to the anus or beyond; the caudal is deeply lunate, with pointed tips.

The color in preservative is uniform reddish brown, the belly, preventral, and prepectoral areas more or less bluish gray to whitish, the head more or less reddish yellow; small dark brown spots are scattered over the upper half of the body, from behind the eyes to the caudal peduncle; a few vague dark brown spots on the spinous dorsal and a median longitudinal row of dark brown spots on the second dorsal rays; the inner surface of the pectoral is dusky or blackish except between the two lowermost rays, with some pale or white spots on the membranes of the 3 lower dusky rays; free pectoral rays white; other fins not pigmented.

Here described from the type, 93 mm. long, and 3 paratypes 80 to 94 mm. in length, taken from outer Manila Bay, in 64 fathoms; one paratype 91 mm. long, from the south entrance to Manila Bay off the Cavite Province coast in 54 fathoms; and 5 paratypes 78 to 98 mm. in length from the China Sea near Fortune Island, off the coast of Batangas Province, at 65 fathoms.

We place with the above two specimens diverging in several particulars. The head is broader, the snout longer, and the mouth decidedly larger; the maxillary extends to a vertical from the front of the pupil or to its center; the pectoral is longer, reaching to the base of the eighth anal ray; the preventral region is naked, with no trace of scales. The color is darker and the spots, particularly in the larger specimen, are much larger, and more numerous. Two specimens 84 and 93 mm. in length, taken at 65 fathoms in the south entrance to Manila Bay, off the coast of Cavite Province, Luzon.

The specific appellation is based on Tagal or Tagalog, a people of certain provinces of Luzon, and their language.

***Lepidotrigla deasoni* Herre and Kauffman, new species**

Dorsal IX-15; anal 14; 55 to 58 scales in the lateral line, 3 scales above it to the second dorsal origin; 4 or 5 rows of very small predorsal scales; pectoral base and preventral region naked; basal half of caudal scaled.

Depth 3.6 to 3.8, head 2.7, caudal 4.1 or 4.2, pectoral 2.9 to 3 times in the length. The broad snout is about 2.3 in the head; the eye is about 1.5 in the snout or 3.5 in the head; the bony elevated orbital rim

has 2 or 3 anterior spines, or these may be absent on one side, and one or two posterior spines are usually present; interorbital space concave, its breadth 4.3 to 4.5 times in the head; a transverse groove directly behind the orbital rim and a conspicuous groove from eye to snout on each side of the preorbital plate. The mouth is small, the maxillary not or barely reaching a vertical from the front margin of the eye; no vomerine or palatal teeth.

The dorsal profile of the wedge-shaped body tapers downward rapidly from the large bony head. Rostral spines horizontal, smooth, flattened, short, less than half an eye-diameter in length, the distance between their tips a little more than an eye diameter, the bony processes holding them finely denticulate. A large suprascapular plate tipped with a sharp spine, its total length about equal to eye; opercular spine of moderate length, its base very broad, almost entirely covering the opercle; humeral spine long, slender, sharp, extending to a vertical from the base of the fourth dorsal spine, equal to the eye, the height of its bony base equal to the total length of the spine. The free pectoral rays shorter than the upper part of the pectoral which reaches to the base of the sixth anal ray.

First dorsal spine 2.2 to 2.3, the second dorsal spine about twice, the third dorsal ray about 3, and the third anal ray about 3.2 times in the head; the least height of the caudal peduncle is 1.4 to 1.5 in the eye.

Twenty-four bony scutes along each side of the dorsal base; the first 3 to 5 are flat and spineless, all the rest with a strong spine; sometimes the anterior scutes are fused so that there seem to be 23 or even 22.

The color in alcohol is brown, darkest on the head, more or less gray on the preventral region; fins more or less concolorous except the pectorals which have their inner surfaces largely blackish, the outer rays all whitish.

Here described from the type, 97 mm. in length, and paratype 87 mm. in length, taken by trawl at 65 fathoms in the south entrance to Manila Bay, off the coast of Cavite Province, and 5 paratypes 80 to 92 mm. in length taken at 34 fathoms 6 miles southeast of Monja Island, in the south entrance of Manila Bay, off Cavite Province, Luzon.

This species is named in honor of Dr. H. J. Deason, Chief of the Office of Foreign Activities, U. S. Fish and Wildlife Service, who has taken great interest in Philippine fish and fisheries and has zealously promoted their study.

Lepidotrigla spiloptera Günther

Lepidotrigla spiloptera Günther, "Challenger" Reports,

Zoology, vol. I, Shore Fishes, p. 42, plate XVIII, fig c, 1880;

Aarafura Sea, Kei Islands.

Weber, Fische Siboga Exped., p. 511, 1913.

Six specimens, 75 to 88 mm. in length were taken at a depth of 30 fathoms in the entrance to Manila Bay. The pectoral reaches to the base of the fourth to the seventh anal ray. *Lepidotrigla argyrosoma* Fowler has a much longer pectoral, its tip opposite the base of the eleventh anal ray.

Lepidotrigla venusta Fowler

Lepidotrigla venusta Fowler, Proc. U. S. Nat. Mus., vol. 85, p. 103. fig.

48, 1938; Lingayen Gulf off San Fernando Point Light. La Union Province, Luzon, in 45 fathoms; type 111 mm. long.

Three specimens 83 to 88 mm. in length were taken by the junior author at a depth of 15 fathoms, from Manila Bay. Our examples agree in most respects; one specimen has the dorsal IX-14, anal 14, instead of D. IX-15, A. 15. Our specimens all have a pointed pectoral, with the central rays elongated, instead of the rounded pectoral of Fowler's figure. Likewise our specimens have a lunate caudal with pointed tips.

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A NEW SUBSPECIES OF PIPIT FROM ARGENTINA
AND PARAGUAY

BY JOHN T. ZIMMER

A small consignment of birds recently submitted to me for identification by Sr. Juan G. Esteban of the Fundación Miguel Lillo of Tucumán, Argentina, contained two examples of a pipit that proved to be of unusual interest. For many years there has been a specimen in the collections of the American Museum of Natural History that was obviously of a new form, but which it was undesirable to name without additional material to confirm its characters. Comparison showed that the newly arrived specimens undoubtedly belong to this same new form.

Relationship of the new form appears to be with *Anthus chii* [= *lutescens*] but whether the distinctions are of specific or only subspecific value has proved difficult to determine. One of the principal characters, the shape and length of the hind claw, is frequently a specific criterion in pipits, but in most other respects the new birds closely follow the general pattern and size of *chii*. No overlap in range is evident but "*lutescens*" has been reported from localities near to those where the new bird was obtained. Through the kindness of Dr. Herbert Friedmann, of the U. S. National Museum, I have been able to borrow a small series of birds from the same general region, obtained some years ago by Dr. Wetmore. To my surprise, I found among these skins four more specimens belonging to the new form. None of the seven specimens now in hand came from the exact locality represented by any available specimen of *chii*, but none is a breeding specimen, and the exact breeding range is still to be determined. Since no overlap has appeared in the wintering ranges of *chii* and the new form (and the breeding range of *chii*) there is no reason to expect an overlap in nesting time, although the possibility exists. If such overlap occurs, it will be necessary to elevate the new form to specific rank. In the meantime I consider it a well-marked member of the *chii* group that may be known as follows.

Color terms are capitalized when direct comparison has been made with Ridgway's "Color Standards and Color Nomenclature."

***Anthus chil chacoensis*, new subspecies**

Type from Avia Terai, Gobernación de Chaco. Argentina; altitude 350 feet; no. 142016, American Museum of Natural History; adult female collected May 2, 1916, by Leo E. Miller and H. S. Boyle; original no. 16431.

Diagnosis.—Similar to *A. c. chii* [= *lutescens*] of Paraguay (and Bolivia, northern Argentina, and southern Brazil) but differing by paler

and more whitish (less buffy or brownish) dorsal streaking, more pinkish buff (less yellowish) under parts; more pronounced streaking on the flanks; less extensive white markings on the outer two pairs of rectrices (on the average); and shorter and more curved hind claw.

Range.—Argentina and Paraguayan Chaco, at least in the non-breeding season.

Description of type.—Top of head with centers of feathers near Chaetura Black sharply margined laterally with Pale Olive-Buff, giving a strongly streaked appearance; hind neck with dark centers a little browner and the margins near Light Drab; mantle like crown but with the margins of the feathers paler and more whitish, especially toward the scapulars where they tend to produce the effect of a prominent lateral stripe on each side; lower back dark Buffy Brown with dusky central stripes poorly defined; upper tail-coverts with dusky shaft-streaks bordered faintly with a rufescent brown which passes through Drab to near Smoke Gray on the edges of the feathers. Chin and center of throat more whitish than Pale Pinkish Buff, passing laterally and posteriorly into Pinkish Buff; breast Pinkish Buff with prominent, somewhat sagittate, dark brown terminal shaft-spots, broader on the sides and continued down the flanks in strong shaft-stripes although the margins of the feathers become more whitish; upper belly likewise passes from the Pinkish Buff of the breast through Pale Pinkish Buff to even more whitish in the anal region; under tail-coverts again a little more buffy. Remiges dark brown; outer margin of outermost primary whitish to the shaft, except toward the tip where it is somewhat withdrawn to the outer margin, only; outer margins of the next four or five primaries narrowly whitish, with the margins of the remaining primaries and secondaries becoming more buffy brownish in tone; tertials somewhat like the mantle, blackish, with prominent whitish margins; inner margins of the primaries and secondaries broadly whitish or faintly buffy, reaching near the tips of the inner feathers but becoming shorter on the outer ones; this pale area reaches the shaft broadly at the basal portion on the outermost primary; upper wing-coverts sooty brown, broadly edged and tipped with buff; under wing-coverts and axillars light buff. Tail with median rectrices dusky brown margined with slightly buffy whitish; next four pairs more blackish, with outer margins narrowly ashy; subexternal pair with a fine whitish spot at the tip of the feather; outermost pair with the outer web white and the inner web white at tip and in a broad stripe on the inner portion narrowing basad but reaching near the base of the feather. Bill (in dried skin) with maxilla light brown and mandible Honey Yellow; feet light Honey Yellow. Wing, 66 mm.; tail, 46; exposed culmen, 10; culmen from base, 13.5; tarsus, 19; hind toe, 6.5; hind claw, 7.

Remarks.—Males are like the females.

Worn examples are even more strikingly whitish-streaked above than the type which is in fine, fresh plumage. They are also more whitish on the belly and throat, and the other light markings on various areas are correspondingly lighter in color. Worn examples of *c. chii*, although they sometimes appear somewhat whitish below, almost always agree with the fresher examples of the same form in having a distinctly yellowish tone, quite pronounced in many specimens. The buff of the breast shows the same distinction in tone. The upper parts of *chii*, in

the specimens examined, always have the marginal streaks distinctly brownish and the dark centers also of a brownish black hue.

The clear, sharp margins of the dorsal plumage give *chacoensis* a more markedly streaked appearance than is shown by *chii*, approximating the difference of that nature exhibited by *Anthus hellmayri* in comparison with *A. furcatus*. The length and shape of the hind claw reverses this comparison and suggests the character of *furcatus* in comparison with *hellmayri*. It raises the question whether *chacoensis* is not best considered as a species rather than a subspecies of *chii*, and if the two are ever found breeding together, that arrangement will become obligatory. So many characters, however, appear to be of only subspecific value that for the present I suggest the subspecific relationship. In any case, the hind claw in the specimens of *chacoensis* examined measures 7 to 8 mm. in length, averaging 7.8, while in *chii* it is 9.5 to 14, averaging 11.5. There is an overlap in the tail-pattern of the two forms, and here, again, *chacoensis* suggests *furcatus* although that species is widely distinct in various other particulars and can have no close relationship to *chacoensis*.

Specimens from northeastern South America (the Guianas and adjacent areas) show an average of more white on the tail than the more southern examples, but there is much overlapping with *chii* though less with *chacoensis* which is at the other extreme. Other factors of distinction also argue for the recognition of *abariensis* (*Notiocorys abariensis* Chubb, Bull. Brit. Orn. Club, 41: 79, 1921—Abary River, British Guiana). There is distinctly less yellowish color on the under parts although not the clearer buff or whitish of *chacoensis*; the upper parts are lighter in tone, with the centers of the feathers less deeply blackish and the margins somewhat warmer; the hind claw is as in *chii*, being longer and less arcuate than in *chacoensis*. In series, the populations are readily distinguishable, and most of the individual specimens as well. The reduced amount of pectoral streaking in *abariensis*, that was one of the characters mentioned by Chubb, is apparent in most specimens, but is not consistent.

A small series of birds from Maranhão, Brazil, approaches *abariensis* in respect to the weakening of the yellow color on the under parts, but the pectoral streaking is quite prominent. Two Piauí birds agree with them in respect to the yellowish coloration, but the pectoral streaks are weak, while a third Piauí example has the reduced streaking combined with the yellowish tings of *chii*. Several specimens from the State of Bahia are like this third Piauí bird. From Espírito Santo and more southern localities, the series are relatively consistent, with dark upper parts, relatively strong pectoral markings, and yellowish coloration from chin to under tail-coverts. The various tendencies shown from Maranhão to Bahia are too irregular to suggest the need for taxonomic distinction.

I append the list of specimens only of *abariensis*, *chii*, and *chacoensis* since *peruvianus* and *parvus*, although apparently conspecific, do not enter into the foregoing discussion.

A. c. abariensis.—

VENEZUELA:

(Maripa, Suapure, Paulo [Roraima], Arabupú, and Auyantepui),

6 ♂, 2 ♀, 2 (♀).

CAYENNE: 1 ♂.

BRITISH GUIANA:

(Abary, Annai, and Rupununi River), 2 ♂, 2 (♀).

BRAZIL:

(Frechal [Rio Surumú] and Limão [Rio Cotingal]), 3 ♂.

A. c. chii.—

BRAZIL:

Maranhão (Anil, Rosario, and Miritiba), 3 ♂, 3 ♀, 2 (♀);

Pará (Cussari and Espírito Santo), 3 ♂;

Piauí, Os Morros, 1 ♂, 2 ♀;

Baia (Barra, Remanso, Baia, and Baia trade-skins), 3 ♂, 1 ♀, 5 (♀);

Espírito Santo, Lagôa Juparaná, 2 ♀;

Rio de Janeiro (trade-skins), 3 (♀);

Mato Grosso, Chapada, 1 ♂, 1 ♀.

ARGENTINA:

Tucumán (Sarmiento and Tucumán), 7 ♂, 2 ♀;

Chaco, Las Palmas, 1 ♂¹, 1 ♀¹;

Buenos Aires, Barracas al Sud, 1 ♂, 1 ♀, 1 (♀).

PARAGUAY:

(Fort Wheeler, Puerto Pinasco, Chaco, Makthlawaiya, and Colonia Independencia), 3 ♂, 2 ♀;

Puerto Pinasco, Kilometre 80, west, 3 ♂¹, 2 ♀¹.

A. c. chacoensis.—

ARGENTINA:

Chaco, Avia Terai, 1 ♀ (type);

Chaco, Las Palmas, Río Ca-a, 1 ♀¹;

Formosa, Kil. 182, Riacho Pilaga, 10 mi. n.w., 1 ♀¹;

Formosa, San José, 2 ♂².

PARAGUAY:

Puerto Pinasco, Río Paraguay, 2 ♀¹.

¹Specimens in U. S. National Museum.

²Specimens in Fundación Miguel Lillo, Tucumán.

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HISTORY AND NOMENCLATURE OF THE POCKET GOPHERS
(GEOMYS) IN GEORGIA

BY FRANCIS HARPER

Apparently the first reference to Pocket Gophers in Georgia is by Bartram,¹ in his discussion of the fauna of Colonel's Island, Liberty County: "There is a large ground-rat, more than twice the size of the common Norway rat. In the night time, it throws out the earth, forming little mounds, or hillocks." The animal is now extinct on this island, not having occurred there within the memory of living man. Its local extinction must have been due to natural causes. In view of the plasticity of the genus *Geomys*, probably this insular inhabitant, like the one on Cumberland Island (*G. cumberlandius*), was distinct from any mainland form.

On a subsequent page, in reporting on the country south of the Altamaha River, Bartram writes:² "The little mounds, or hillocks of fresh earth, thrown up in great numbers in the night, have also a curious appearance." Although he does not here name the makers of the mounds, they must have been Pocket Gophers.

An anonymous article of 1801³—ascribable to Samuel L. Mitchill—is entitled "Undescribed Little Quadrupe of Georgia." It mentions the receipt of a specimen from Georgia; it then proceeds to quote a description by John Milledge of a "*mus*" that "was caught by Mr. Stephen Pierce, living midway between Savannah and Augusta"—i. e., in Screven County. This is a detailed description of the local *Geomys*. It was thought to belong "to the division of the *criceti*, or *hamsters*." Whether the specimen received was the one on which the accompanying description was based, is not made clear.

On December 13, 1802, Bartram wrote⁴ to Benjamin Smith Barton concerning a painting of a "Northern Rat" and compared it with the "Floridan *Earth Ratt*." Both animals had cheek pouches. The painting (evidently in Barton's possession) may have represented *Geomys bur-sarius* (Shaw, 1800), of the Mississippi Valley.

In 1804 Anderson⁵ furnished a figure with a description of "The Hamster of Georgia." The latter is a slightly paraphrased version of Milledge's account, to which a reference is given. The figure is apparently the first one of the species ever published. It may have been drawn from the specimen mentioned by Mitchill in 1801. In fact, the latter⁶ claims the authorship of the description in the Anderson-Bewick volume.

On December 27, 1805, Barton wrote⁷ to Thomas Jefferson: "The *Tucan* of Hernandez I lately received from Georgia. It is a most singular quadrupe, of which the systematic naturalists know nothing sure." Although this animal was a *Geomys* (see next paragraph), there is nothing to indicate which form it was, out of the five now known from Georgia.

A year later Barton published⁸ a note on "*Mus tuza*." The description is so brief and incomplete that it could apply to any of the Geomyidae. He completely omits any statement as to the provenance of the live specimen he had. He remarks that the animal was first described by Hernandez under the name of "Tucan." He gives no title, place of publication, or date of that author's work. If the reference had been supplied, it might have read somewhat as follows: Hernandez, *Nova Plantarum, Animalium et Mineralium Mexicanorum Historia*, Animalia, liber 1, tractus 1: 7, 1651 (Roma). Barton was almost certainly aware of the Mitchill-Milledge account of 1801, but he made no reference to it, being habitually chary of giving credit to his fellow-naturalists. He thus missed the opportunity of making the name *tuza* available for a Georgia animal. Under these circumstances Miller⁹ was scarcely justified in citing *Mus tuza* Barton (1806) as the original reference for the Georgia Pocket Gopher, with "Georgia" as the type locality.

Mease¹⁰ gives an account of the "Hamster of Georgia." It is merely a reprint of the greater part of the Mitchill-Milledge paper of 1801, with an additional sentence: "A cut of the hamster may be seen in the additions to Mr. Anderson's edition of Bewick's history of quadrupeds, New York, 1804."

Ord¹¹ lists the "Sand or Earth Rat—*Mus tuza*," with a footnote: "Called by some writers *Georgian Hamster*, though it differs materially from the Hamsters of Europe in its cheek pouches." Ord's failure to provide either a description or definite references to previous authors eliminates his use of the name *tuza* from consideration, although it was accepted in 1875 by Coues¹² and in 1895 by Merriam,¹³ who defined the type locality as "pine barrens near Augusta, Georgia."

Rafinesque,¹⁴ after presenting a diagnosis of his new genus *Geomys*, introduces the following species:

"*Geomys pinetis*. Raf. Murine colour, tail entirely naked, shorter than the body.—Obs. This animal has been called Georgia Hamster, by Milledge, Mitchill, Anderson, Mease, &c. It lives in Georgia, in the region of the Pines, where it raises little mounds, size of a rat."

All the references just mentioned (Milledge, Mitchill, Anderson, and Mease) are to the Pocket Gopher of the Savannah River valley. Rafinesque's name is evidently the first valid one applied to it. Screven County, Georgia, is the type locality of this form.

Harlan¹⁵ and Godman¹⁶ extend the range of *bursarius* as far as Georgia and Florida, and they recognize no other form in the Southeast.

Sir Charles Lyell,¹⁷ writing of a visit near Millhaven, Screven County, in January, 1842, says:

"We also saw small hillocks, such as are thrown up by our [British] moles, made by a very singular animal, which they call a salamander, because, I believe, it is often seen to appear when the woods are burnt. It is not a reptile, but a species of rat (*Pseudostoma pinetorum*), with pouches in its cheeks."

Audubon and Bachman's *Pseudostoma floridana*,¹⁸ as published, is a composite of several different forms, its range being given as "Georgia, Florida, Alabama, and Mississippi," with a northeastern limit at "the southwestern bank of the Savannah River in Georgia." They record specimens from Dallas County, Alabama, Ebenezer, Effingham County, Georgia, and the vicinity of St. Augustine, Florida; and they state that their species is probably the one referred to by Rafinesque as Georgia

Hamster. They thus come perilously close to making their *floridana* a synonym of Rafinesque's *pinetis*. However, the type locality of their species was restricted by Merriam¹⁹ to "St. Augustine, Florida," and consequently Audubon and Bachman's *floridana* remains valid.

Le Conte²⁰ makes *floridana* a synonym of *G. "pineti"* Rafinesque; he records specimens from Florida and Alabama, and states that the species "also inhabits the lower parts of Georgia." Baird²¹ and Coues²² give a similar statement of range, keeping *floridana* in synonymy. Gesner²³ contributes excellent life-history notes on the "salamander, (*Geomys pineti*), of Georgia"; but since they were secured in Russell County, Alabama, they presumably pertain to the subspecies *mobiliensis* of Merriam.²⁴ Bangs²⁵ gives the range of this form as "western Georgia, western Florida, and the coast region of Alabama," while Howell²⁶ extends it north to west central Alabama.

Bangs²⁷ records numerous specimens of *G. "tuza tuza"* (= *pinetis*) from Hursman's Lake (Screven County), Adam (Richmond County), Pinetucky (Jefferson County), Doctortown (Wayne County), and Sterling (Glynn County), Georgia. He also describes two new Georgia species with very restricted ranges: *G. colonus*, from about 4 miles west of St. Mary's, and *G. cumberlandius*, from Cumberland Island.

R. M. Harper writes²⁸:

"In both Georgia and Alabama the salamander [*Geomys*] ranges all the way across the coastal plain up to the fall-line, in about latitude 33° 15'. . . . The Biological Survey . . . has a record of just one station for it outside of the coastal plain, namely, near Chipley [Harris County], Georgia. . . .

"The southeastern salamander seems to be invariably associated with the long-leaf pine (*Pinus palustris*)." In the same paper there is also discussion of an apparent correlation between the distribution of this animal and the occurrence of periodic fires in the long-leaf pine forests.

Sherman²⁹ describes *G. fontanelus* from a very restricted area of "Norfolk very fine sand," "only a few miles in extent, lying about 7 miles northwest of Savannah." He differentiates this form from Bangs's specimens of "*tuza*" from "Hursman's Lake (Savannah River), near Bascom, Scriven County, Georgia,"³⁰ Bangs's map indicates that this lake is in the southeastern part of Screven County, whereas Bascom is in the northwestern part and about a dozen miles from the nearest point on the Savannah River. I find the name "Hursman's Lake" on no other map than Bangs's, and the matter requires clarification. In any event, however, these specimens of Bangs may be regarded as virtual topotypes of *pinetis*.

In a later paper Sherman³¹ points out that intergradation between "*tuza*" and *mobiliensis* and the races of peninsular Florida occurs between the Apalachicola and Suwannee Rivers. For this reason he treats all the Florida forms as subspecies of "*tuza*."

From the foregoing discussion it would appear that the names of certain southeastern Pocket Gophers should stand as follows:

Geomys pinetis pinetis Rafinesque (1817)

Geomys pinetis floridanus (Audubon and Bachman, 1846)

Geomys pinetis mobiliensis Merriam (1895)

Geomys pinetis austrinus Bangs (1898)

Geomys pinetis goffi Sherman (1944)

Three other forms, already mentioned, were originally described from

Georgia as full species. An investigation of their exact taxonomic relationships to *pinetis* is beyond the scope of the present paper. They are:

Geomys colonus Bangs (1898)

Geomys cumberlandius Bangs (1898)

Geomys fontanelus Sherman (1940)

Maps indicating the distribution of *Geomys* in Georgia (or in parts of the state) have been published by Merriam,³² myself,³³ and Hamilton.³⁴ Apparently variation in soil and (to some extent) isolation by means of water barriers are environmental factors of importance in the evolution of the various forms of this genus.

In the preparation of these notes I have benefited by several suggestions from Dr. Remington Kellogg.

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- ²¹*Repts. explorations and surveys . . . Mississippi River to the Pacific Ocean* 8, pt. 1, mammals: 380, 1857.
- ²²*Proc. Acad. Nat. Sci. Philadelphia* 27: 132, 1875.
- ²³*Ann. Rept. Smithsonian Inst.* 1860: 431-433, 1 fig., 1861.
- ²⁴*No. Am. Fauna* 8: 119, 1895.
- ²⁵*Proc. Boston Soc. Nat. Hist.* 28 (7): 175, 1898.
- ²⁶*No. Am. Fauna* 45: 60, fig. 6, 1921.
- ²⁷*Proc. Boston Soc. Nat. Hist.* 28 (7): 176, 178, 180, 1898.
- ²⁸*Science*, n. s., 35 (890): 116, 118, 1912.
- ²⁹*Jour. Mammalogy* 21 (3): 343, 1940.
- ³⁰*Proc. Boston Soc. Nat. Hist.* 28 (7): 176, 202, and map facing p. 159, 1898.
- ³¹*Proc. New England Zool. Club* 23: 38, 1944.
- ³²*No. Am. Fauna* 8: maps 1, 4, 1895.
- ³³*Proc. Boston Soc. Nat. Hist.* 38 (7): 337, fig. 1, 1927.
- ³⁴*Mammals of eastern United States*: 251, fig. 118, 1943 (Ithaca).

PROCEEDINGS
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BIOLOGICAL SOCIETY OF WASHINGTON

NINE NEW SUBSPECIES OF BIRDS FROM VENEZUELA

BY WILLIAM H. PHELPS AND WILLIAM H. PHELPS, JR.

Study of specimens in the Phelps Collection, Caracas, and of comparative material in the American Museum of Natural History, shows the following new subspecies. Specimens listed are in the Phelps Collection unless otherwise specified.

We wish to express our thanks to Mr. James L. Peters of the Museum of Comparative Zoology, to Dr. John T. Zimmer of the American Museum of Natural History and to Dr. Herbert Friedmann of the United States National Museum for access to the collections in those institutions.

Names of colors are capitalized when direct comparison has been made with "Ridgway's Color Standards and Color Nomenclature," 1912.

Crypturellus undulatus manapiare, new subspecies

Type: From San Juan de Manapiare, Río Manapiare, Territorio Amazonas, Venezuela; 160 meters. No. 52247, Phelps Collection, Caracas, Venezuela. Adult male collected March 3, 1951, by Ramón Urbano. (Type on deposit at the American Museum of Natural History.)

Diagnosis: Differs from all races of *C. undulatus* by the darker, more dusky forehead and fore-crown, instead of more brownish; closest to *C. u. confusus* (Brabourne and Chubb) from the Rio Madeira from which it differs only by color of crown; differs from *C. u. yapura* (Spix) from Manaos, additionally, by heavier barring on flanks and crissum.

Range: Collected on the Manapiare River and its affluent, Caño Negro, in the Ventuari River Basin, in the Tropical Zone.

Description of Type: Forehead and fore-crown brownish dusky, merging into the more brownish of neck, back Sayal Brown, paler on the mantle and merging into the more grayish rump and light grayish tail; entire upper parts except head and neck finely vermiculated with black; sides of head grayish brown. Chin white merging into the pale gray throat which is heavily spotted with white; breast and sides grayish olive, browner anteriorly with very fine dusky vermiculations; abdomen, anteriorly, buffy gray merging into whitish posteriorly where barred prominently with brownish black; flanks buffy, heavily barred with brownish black. Primaries (and bastard wing) Natal Brown, inner webs on lower surface broadly edged with grayish and finely vermiculated with black as on back; external under wing-coverts Natal Brown, internal ones grayish white; axillaries pale brown. Tail dark buffy, below more grayish, with fine black vermiculations. Bill (in life) "black"; feet "yellowish green"; iris "chestnut". Wing, 158 mm.; tail, 50; culmen from base, 33; tarsus, 53.

Remarks: Sexes alike. Size similar to *yapura*. Range of measure-

ments: six adult males—wing, 158-175(165.1); tail, 50-55(51.3); culmen from base, 33-34(33.3); five adult females—wing, 163-173(168.4); tail, 50-55(52.8); culmen from base, 33-35(33.6). Measurements of *yapura*: six males from Cacao Pereira Igarapé, lower Rio Negro, Brasil—wing, 156-167(161.8); tail, 43-47(44.7); culmen from base, 31-34(32.6).

On two previous expeditions to the Ventuari River region this tinamou was heard singing, first in 1947 on the Caño Parucito and then in 1949 on the Río Parí and its affluent the Río Asisa. We tried unsuccessfully to collect it but its melancholic call was so melodious and characteristic that we even gave the unknown bird a name: "The Tales of Hoffmann Tinamou" because its most frequent song reminded us of the first three notes of the Barcarolle. The range, consequently, probably extends to the rivers mentioned and also to the upper reaches of the Ventuari River where the Maquiritare indians informed us that this tinamou is also found.

The known range of the new race is separated by some 700 kilometers from that of *simplex* (Salvadori) in southern British Guiana. The ranges of the other races of *undulatus* are still more distant.

An immature female is similar to the adults except that many feathers on the breast and sides have prominent black spots or bars.

Six of the specimens are decidedly more buffy below, less grayish, than the type, while five are more rufous, less buffy, above, but there are also intermediates in the series.

Specimens Examined

*C. u. undulatus*¹.—BRAZIL: Chapada, Matto Grosso, 4♂, 1♀; Uru-cum, 3♂, 2♀. BOLIVIA: Chiquitos, 1♂; Prov. of Sara, 1♂.

*C. u. confusus*¹.—BRAZIL: Rosarhino, Rio Madeira, 2♂, 1♀.

*C. u. vermiculatus*¹.—BRAZIL: Araguaya, Goyaz, 3♂ 1♀; Rio Jordao, Minas, 1♂.

*C. u. adspersus*¹.—BRAZIL: Rio Tapajoz, 1♂, 1♀; Anaré, Igarapé, Rio Madeira, 2♂, 4♀.

*C. u. yapura*¹.—BRAZIL: Cacao Pereira Igarapé, Rio Negro, 7♂, 1♀. COLOMBIA: La Murelia, Caquetá, 1♂, 1♀. ECUADOR: Rio Suno Abajo, 1♂; Boca Rio Curaray, 2♂, 2♀.

C. u. manapiare.—VENEZUELA: San Juan de Manapiare, Río Manapiare, Territorio Amazonas, 6♂ (incl. type), 3♀, 2♀ juv., 1 (♀) juv.; Caño Negro, Río Manapiare, 2♀.

Lurocalis semitorquatus schaeferi, new subspecies

Type: From Rancho Grande, Estado Aragua, Venezuela; 1130 meters, No. 53969, Phelps Collection, Caracas, Venezuela. Adult male collected February 3, 1951, by Ernst Schaefer, Rancho Grande Biological Station. (Type on deposit at the American Museum of Natural History.)

Diagnosis: Nearest to *L. s. semitorquatus* (Gmelin) from which it differs by larger size; blacker, less brownish throat and breast, with paler buffy speckling; the light areas on wing-coverts and tertials whiter and more extensive. Differs greatly from *L. s. rufiventris* Taczanowsky by the barred abdomen.

Range: Known only from the region of Rancho Grande in the

¹Specimens in the American Museum of Natural History.

Tropical and lower Subtropical Zones at altitudes of 450 and 1150 meters.

Description of Type: Top and sides of head, nape and back brownish black, more brownish on uropygium, speckled with pale buffy (whitish on nape) on edges of feathers giving a striped appearance; prominent whitish areas laterally on mantle; concealed feathers above the eye, and in upper tail-coverts, largely white. Chin blackish speckled with white; a prominent white band across anterior throat; posterior throat and breast blackish with buffy and whitish speckling and barring; abdomen Cinnamon, more whitish anteriorly; under tail-coverts paler. Wings Bone Brown; outer webs of remiges barred with dark buff; tips of inner primaries largely whitish; tertials largely white with prominent blackish shaft spots, minutely and closely speckled with pale brown; upper wing-coverts barred or speckled with buff as on primaries, middle ones largely edged with white; under wing-coverts and axillaries uniform with abdomen. Tail Bone Brown; rectrices, except middle ones, barred with buffy, apically with whitish; middle rectrices widely barred with grayish with brown mottling. Bill (in dried skin) black; feet brown. Wing, 195 mm.; tail, 80; culmen from base, 20; culmen from nostril, 7; tarsus, 12; weight in flesh, 83 gr.

Remarks: Sexes alike. Wing longer than in *semitorquatus*. Range of measurements: ten adult males—wing, 175-210(185.4) mm.; tail, 75-98(79.3); culmen from base (6), 17-20(18.6); ten adult females—wing, 183-198(188.5); tail, 73-88(79.5); culmen from base (2), 21-21(21); three adults of undetermined sex—wing, 186-210(195); tail, 84-88(85.3). Measurements of *semitorquatus* from Trinidad: two adult males—wing, 163-169(166); tail, 73-75(74); culmen from base, 17-18(17.5); two adult females—wing, 176-177(176.5); tail, 75-80(77.5); culmen from base, 17-18(17.5); one adult of undetermined sex—wing, 170; tail, 76; culmen from base, 18.

There is a specimen in the American Museum of Natural History, a male from Telembi, northwestern Ecuador, which had been identified as *semitorquatus*, quite outside of the range of this subspecies. Dr. John T. Zimmer suspected that it might be *noctivagus* Griswold² from Panamá, known only from the unique type in the Museum of Comparative Zoology, as it seemed different from the American Museum series from Trinidad. Mr. J. L. Peters sent this type to Dr. Zimmer for comparison. The Telembi skin proved to be more similar to it than to *semitorquatus*. It resembles *noctivagus* in larger and rounder, more rufescent, spots on crown, back and upper tail-coverts. The breast markings are intermediate, not as prominent and rufous as in *noctivagus* but closer to it than to *semitorquatus*.

We are pleased to name this bird after the collector, Dr. Ernst Schaefer, in charge of the Rancho Grande Biological Station, who, in the short time that he has been there, has already made important contributions to the ornithology of the Rancho Grande National Park.

Specimens Examined

L. s. noctivagus.—PANAMA: Salamanca Hydrographic Station, Río Pequení, 1 ♀³. ECUADOR: Telembi, 1 ♂¹.

²Proc. New England Zool. Cl., 15, p. 101, 1936.

³Specimens in Museum of Comparative Zoology.

L. s. rufiventris.—VENEZUELA: San Jacinto, Mérida, 1 ♂; Mérida, 1 ♂¹; La Sierra, 1 ♀¹; Montañas, 1 ♂ juv.¹; Conejos, 1 ♂¹; Valle, 1 ♀¹. COLOMBIA¹: Subia, Cundinamarca, 1 ♀; Aguadita, Fusugasuga, 1 ♀.

L. s. schaeferi.—VENEZUELA: Rancho Grande, Aragua, 1 ♂ (type), 1 ♂, 4 ♂⁴, 8 ♀⁴, 3 (?)⁴; near Rancho Grande (450 m.), 3 ♂⁴, 1 ♂, 2 ♀⁴.

L. s. semitorquatus.—TRINIDAD¹: 2 ♂, 2 ♀, 1 (?). VENEZUELA: La Faisca mine, Cerro Paurai-tepui, 1 (?) juv.

***Nyctiprogne leucopyga pallida*, new subspecies**

Type: From San Fernando de Apure, Estado Apure, Venezuela; 140 meters. No. 47719, Phelps Collection, Caracas, Venezuela. Adult female collected October 30, 1948, by Ramón Urbano. (Type on deposit at the American Museum of Natural History.)

Diagnosis: Differs from *N. l. exigua* Friedmann of the Upper Orinoco by paler upper parts, the buffy markings lighter and more extensive and the blackish ones more restricted; differs from *N. l. leucopyga* (Spix) of the Amazon River by being paler and smaller.

Range: Along the lower Orinoco River from Barrancas up to Caicara and up the Apure River to Guasualito; also on the lower Paragua River.

Description of Type: Head, back and rump Pinkish Cinnamon, finely speckled with dusky on head and rump and finely barred on nape; top of head striped prominently with blackish; scalpulars with heavy black blotches along shaft and edged with prominent Ochraceous-Buff spots. Chin, throat, breast and sides Pinkish Cinnamon, finely barred with dusky; middle breast barred more heavily with buffy white and dusky; abdomen, flanks and under tail-coverts whitish, heavily barred with brownish black. Wings Benzo Brown; outer webs of primaries and secondaries barred with Ochraceous-Tawny, the inner webs lightly so with pale buffy; tertials finely speckled with pale buffy; upper wing-coverts finely speckled and spotted with buffy; under wing-coverts and axillaries dusky, barred with whitish. Tail Natal Brown; six outer rectrices barred basally with Ochraceous-Tawny, whitish on under surface and with a broad white band across the middle, confined to the inner web on the outermost; four middle rectrices barred with buffy mottling.

Bill (in life) "black"; feet "black"; iris "dark". Wing, 125 mm.; tail, 88; exposed culmen, 4; tarsus, 10.

Remarks: Sexes alike. Size similar to *exigua*. Range of measurements of topotypical specimens from San Fernando de Apure: one adult male—wing, 126 mm.; tail, 88; exposed culmen, 4; four adult females—wing, 120-128(124); tail (3), 82-88(86); exposed culmen, 4-4(4); one of undetermined sex—wing, 124; tail, 84; exposed culmen, 4.5. Measurements of *exigua* from Upper Orinoco: three adult males—wing, 132-135 (133.3); tail, 85-90(88); exposed culmen, 4-4.5(4.2); three adult females—wing, 125-130(127.3); tail, 83-88(85.7); exposed culmen, 4-4.5 (4.2).

The specimens from San Fernando de Atabapo and Maipures are intermediates but closer to *exigua* while those from Ciudad Bolívar and Barrancas, though not typical, are closer to *pallida*.

⁴Specimens in Estación Biológica de Rancho Grande, Venezuela.

Specimens Examined

N. l. leusopyga.—BRAZIL: Pinhel, Rio Tapajoz⁸, 1♂, 2♀, 1(?) ; Miri-tituba, Rio Tapajoz, 1♀⁶; Santarem, 1♂³, 1♀³, 1 (♀ juv.)⁵.

N. l. exigua.—VENEZUELA: Río Pacila, Caño Casiquiare, 2♂⁵; frente a la Isla Corocoro, 1♀; San Juan de Manapiare, 2♂ 1♀, 2(?); Puerto Yapacana, 1♂, 1♀, 2(?); San Fernando de Atabapo, 2♂ 4♀, 1♀¹; Maipures, 1♀¹.

N. l. pallida.—VENEZUELA: Guasdalito, 1(?); San Fernando de Apure, 1♂, 4♀ (incl. type), 1(?); Caicara, 1♂¹, 1♂, 1♀; Altigracia¹, 1♂, 3♀; Ciudad Bolívar¹, 2♂, 2♀; Barrancas, 1♂¹; La Paragua, 1♀.

***Phaethornis longuemareus imatacae*, new subspecies**

Type: From Cerro Tomasote, El Palmar, Estado Bolívar, Venezuela; 500 meters. No. 17728, Phelps Collection, Caracas, Venezuela. Adult male collected April 6, 1942, by Fulvio Benedetti. (Type on deposit at the American Museum of Natural History.)

Diagnosis: Differs from all races of *P. longuemareus* by paler, more whitish abdomen. From *P. l. longuemareus* (Lesson), of Trinidad, the Delta of the Orinoco and the Guianas, it differs additionally by paler throat, buffy gray instead of deep buff; breast whiter, buffy white instead of buffy; and upper tail-coverts with less rufous. From *P. l. ignobilis* Todd, of the Caracas region, and *P. l. strigularis* Gould, of the Lake Maracaibo region and Colombia, it differs additionally by a larger bill.

Range: Known only by the type specimen from Cerro Tomasote, Sierra Imataca, in the Tropical Zone.

Description of Type: Top of head and lores Bone Brown, feathers very slightly edged with bronzy, very much so on nape; back and nropygium Buffy Citrine, upper tail-coverts broadly edged with rufous brown; a broad buffy white superciliary stripe; a large dusky post-orbital spot; gular region pale buffy. Chin and throat widely streaked with dusky, merging into the grayish buff of breast; sides of neck Snuff Brown; sides and flanks brownish buffy; abdomen buffy white; under tail-coverts pure white; axillaries whitish. Wings Bone Brown; lesser upper wing-coverts uniform with back; under wing-coverts dusky. Tail bronzy green, middle rectrices broadly tipped with white, the others more narrowly tipped and edged terminally with white, the outermost with buff. Maxilla (in life) "black"; mandible, "yellow, black tip"; feet "flesh"; iris "brown". Wing, 43 mm.; tail, 41; exposed culmen, 26.5; culmen from base, 30; tarsus, 5.

Remarks: Size similar to *longuemareus*. Range of measurements of topotypical *longuemareus* from French Guiana: five adult males—wing, 40.5-42(41.6) mm.; tail, 39-42(40.4); exposed culmen (4), 24-26(25.2); three adult females—wing 41-43(42); tail, 38-40(39.3); exposed culmen (2), 25, 25. Measurements of four adult male *ignobilis* from Cerro Golfo Triste, Miranda—wing, 37-39(37.6); tail (3), 37-39(38); exposed culmen (3), 20.5-24(22). Measurements of three adult male *strigularis* from extreme northwestern Venezuela (La Fría, Táchira, 2; Mene Grande, Zulía, 1)—wing, 34-37(35); tail (2), 34-35(34.5); exposed culmen, 21-22(21.5).

⁸Specimens in U. S. National Museum.

The subspecific name for this bird has been taken from the isolated range of mountains, the Sierra Imataca, along the northeastern boundary of the state of Bolívar, of which Cerro Tomasote is one of its peaks.

Specimens Examined

P. l. cordobae.—MEXICO⁶: 4.

P. l. saturatus.—GUATEMALA⁶: 4.

*P. l. subrufescens*⁶.—PANAMA: 4. COLOMBIA: 6. ECUADOR: 19.

*P. l. atrimentalis*⁶.—COLOMBIA: 1. ECUADOR: 12. PERU: 5.

P. l. strigularis.—VENEZUELA: La Fría, 2♂, 1(?) ; El Vigía, 1(?) ; Mene Grande, 1♂. COLOMBIA⁶: 37.

P. l. ignobilis.—VENEZUELA: Santa Bárbara, Barinas, 1(?) ; Altamira, Barinas, 1(?) ; Barinitas, 2(?) ; Urama, 1♂ ; Las Quiguas, 2♀¹ ; San José de Los Caracas, 1(?) ; Cerro Golfo Triste, 4♂, 1♂¹ ; Cerro Negro, Miranda, 1(?) .

P. l. imatacae.—VENEZUELA: Cerro Tomasote, El Palmar, 1♂ (type).

P. l. longuemareus.—VENEZUELA: Tunapui, 1♂ ; Guaraúños, 1♀ ; Yaguaraparo, 1(?) ; Misión Araguaímujo, 1♂ ; Curiapo, 1♀. TRINIDAD¹: 6♂, 4♀, 4(?) . DUTCH GUIANA¹: Paramaribo, 6♂, 2(?) ; Kuvata, 1♂. FRENCH GUIANA¹: Approuage, 4♂, 3♀ ; Cayenne, 4♂, 2(?) ; Roche Marie, 1♂.

P. l. aethopyga.—BRAZIL⁶: 2.

P. l. idaliae.—BRAZIL⁶: 8.

***Colibri coruscans rostratus*, new subspecies**

Type: From Cerro Huachamacare, Río Cunucunuma, Territorio Amazonas, Venezuela; 2000 meters. Adult male collected December 5, 1950, by Ramón Urbano. (Type on deposit at the American Museum of Natural History.)

Diagnosis: Differs from *C. c. germanus* (Salvin and Godman) from Cerro Roraima and the Gran Sabana mountains, by decidedly longer bill; tail also longer.

Range: Known from the mountains Huachamacare, Duida, Yaví and Guanay in the Upper Orinoco region in the Subtropical Zone at altitudes from 1700 to 2500 meters.

Description of Type: Top of head and back Rinnemann's Green, uropygium more yellowish, the feathers tipped with dusky; forehead against bill, and lores, with a bluish cast; sides of head, ear-coverts and elongated neck tuft Blue-Violet. Chin and forethroat Blue-Violet, centers of feathers dusky, giving a striped appearance, merging into the Light Blue Green of posterior throat and breast, the feathers with wide dusky shaft stripes also giving a striped appearance; sides, flanks and axillaries Rinnemann's Green; abdomen Blue Violet; under tail-coverts Deep Glaucus Green, edged with pale buffy. Wings Dark Purple Drab; lesser upper wing-coverts and under wing-coverts Rinnemann's Green. Two central rectrices Dark Viridian Green, bluer on outer web; rest of rectrices Patent Blue; all rectrices tipped with dusky; a sub-

⁶Specimens in American Museum of Natural History. For localities see Zimmer, Am. Mus. Nov., No. 1449, Jan. 13, 1950, pp. 50, 51.

terminal dark dusky blue band across tail. Bill in life) "black"; feet "black"; iris "dark". Wing, 87 mm.; tail, 58; exposed culmen, 25; culmen from base, 33; tarsus, 6.5.

Remarks: Sexes similar in coloration but male larger. Range of measurements (specimens from Cerro Huachamacare): nine adult males—wing, 86, 84, 84, 85, 80, 84, 82, 87, 83 = 82-87(83.9) mm.; tail, 56, 55, 52, 57, 53, 53, 55, 58, 55 = 52-58(54.9); exposed culmen (8), 25, 24, 23, 24.5, 24, 24.5, 25, 25 = 23-25(24.4); five adult females—wing, 72, 75, 74, 77, 76 = 72-77(74.8); tail, 44, 44, 45, 48, 50 = 44-50(46.2); exposed culmen, 24, 22.5, 24, 26, 22.5 = 22.5-26(23.8); four adults of undetermined sex—wing, 78, 74, 76, 75; tail 52, 47, 46, 46; exposed culmen, 23, 23, 23, 23. Measurements of *germanus* from Mts. Roraima (17) and Kukenam (6); eleven adult males—wing, 81, 82, 83, 82, 80, 80, 85, 83, 81, 80, 82 = 80-85(81.7); tail, 52, 51, 48, 51, 52, 48, 54, 52, 51, 49, 54 = 48-54(51.1); exposed culmen, 22, 21, 21, 21, 21, 21, 21, 20, 21, 21, 24 = 20-24(21.3); eight adult females—wing, 73, 71, 72, 75, 73, 72, 71, 70, 75, 76 = 70-76(72.8); tail, 47, 45, 43, 46, 46, 43, 45, 42, 42, 47 = 42-47(42.6); exposed culmen, 21.5, 20, 21, 21, 21, 21.5, 19, 19, 21, 22 = 19-21.5(20.7); two adults of undetermined sex—wing, 73, 82; tail, 48, 52; exposed culmen, 22, 23.

These measurements show that the bills of the Huachamacare males average 14.6 percent, and the females 15 percent, longer than those from Roraima-Kukenam; in the males the wings are 2.7 percent longer and the tail 7.4 percent, in the females the wings average 2.7 percent longer and the tails 8.5 percent.

The exposed culmen of nine males from Mt. Duida measure 21-26 (24.2), and of twelve females 20-25(22.7) so they are almost typical of the new subspecies, while six males from Mt. Yaví are intermediates measuring 21-25(23). The male from Mt. Guanay measures 26 mm., a maximum length.

The birds from the Gran Sabana mountains, Ptari-tepui (2♂, 20-22, 1♀, 22) Sororopán-tepui (1♀, 20.5) and Uaipán-tepui (1♂, 22; 1♀, 22) have the short bill of the topotypical *germanus* from Roraima and also those from Mt. Guaiquinima (3♂, 21-22(21.5); 8♀, 19-22(20.5)). From Mt. Auyan-tepui one specimen positively sexed as ♂ has a very long bill, 26, and the other specimen of undetermined sex has a short one, 20, but a series is needed for a positive determination; for the time being we refer this population to *germanus* geographically since the two races of southern Venezuela seem to occupy two distinct areas: *germanus* in the mountains of the Gran Sabana and Mt. Guaiquinima, and *rostratus* in the mountains of the Upper Orinoco region.

Specimens Examined

C. c. coruscans.—VENEZUELA: Villa Páez, Páramo de Tamá, 1♂, 1♀, 1(?); Bramón, 1♂; Queniquea, 1♂, 1♀; Boca de Monte, 3♂; Santa Cruz de Mora, 7♂, 5♀; Tabay, 9♂, 1(?); Valle, 6♂; Páramos: La Culata, 3♂, 1♀, Aricagua, 1♂, Santo Domingo, 5♂, 2♀, 1(?), Mucuches, 1♂, Cendé, 3♂, 3♀ and Misisí, 1♂; Timotes, 2♂; Cerro Niquitáz, 1♂; Cubiro, 7♂, 1(?); Colonia Tovar, 2♀; El Junquito, 1♂, 1(?); Pico de Naiguatá, 1♂; San José de Los Caracas, 1(?); Hda. Izcaragua, 3♂.

C. c. rostratus.—VENEZUELA: Cerro Huachamacare, 9♂ (incl.

type), 5♀, 4(?) ; Cerro Duida, 9♂¹, 10♀¹, 2♀ ; Cerro Yaví 5♂, 6♀, 2(?) ; Cerro Guanay, 1♂, 2♀.

C. c. germanus.—VENEZUELA: Cerro Roraima, 7♂, 6♀, 2♀¹; Cerro Kukenam, 4♂, 2(?) ; Cerro Ptari-tepui, 3♂, 1♀, 1(?) ; Cerro Sororopántepui, 1♀, 1(?) ; Cerro Uaipán-tepui, 1♂, 1♀, 2(?) ; Cerro Auyan-tepui¹, 1♂, 1(?) ; Cerro Guaiquinima, 3♂, 8♀, 4(?) .

***Xiphorhynchus picus deltanus*, new subspecies**

Type: From Misión Araguaimujo, Territorio Delta Amacuro, Venezuela; at sea level. No. 49727, Phelps Collection, Caracas, Venezuela. Adult male collected March 15, 1950, by Ramón Urbano. (Type on deposit at the American Museum of Natural History.)

Diagnosis: Differs from all races of *X. picus*, except *extimus* (Griscom) of Panamá and *duidae* (Zimmer) from the upper Orinoco River, by darker, more olivaceous brownish under parts; back darker than all races; bill, horn color darker than all races. Differs additionally from *X. p. picus* (Gmelin), closest geographically, by darker crown, more dusky, less brownish; more prominent whitish shaft streaks on mantle and rectrices darker, more dusky rufous. Differs additionally from *altirostris* (Léotaud) from Trinidad by shorter wing and bill and crown spots darker, more buffy.

Range: Known only from the Delta of the Orinoco River.

Description of Type: Top of head nearest to Raw Umber, with buffy white spots on forehead, and steaks on crown and nape; mantle Brussels Brown × Prout's Brown with a few very narrow long shaft streaks; uropygium Hay's Russet; lores dusky grayish; sides of head and neck dusky with buffy whitish markings; ear-coverts gray streaked with dusky. Chin buffy white; throat pale buffy, the feathers narrowly edged with dusky giving a squamulated appearance merging into the broadly ovate striped whiter breast feathers which are widely edged with dusky, more brownish olive on posterior breast; abdomen, sides and flanks Snuff Brown; paler posteriorly; under tail-coverts more rufous. Remiges Auburn; outermost primaries dusky except on inner webs basally; other primaries and outer secondaries progressively with less dusky; upper wing-coverts of a more brownish tint; bend of wing pale buffy; outer under wing-coverts Pale Vinaceous-Cinnamon, inner ones and axillaries nearer Pinkish Cinnamon. Tail Bay, under surface near Walnut Brown. Maxilla (in life) "black"; mandible "bone color"; feet "olive green"; iris "brown". Wing, 98 mm.; tail, 81 exposed culmen, 28; culmen from base, 30; tarsus, 22.

Remarks: Sexes alike. Size similar to *picus*. Range of measurements: seven adult males—wing, 90-101.5(94.9) mm.; tail (6), 74-81(76.8); culmen from base, 30-32(31.3); three adult females—wing, 91-96(93); tail 74-82(77.3); culmen from base, 29-31(30). Seven adult males of topotypical *picus* from French Guiana—wing, 93-102(97.6); tail, 75-91(80); culmen from base, 29-31(30). Measurements of *altirostris* (Lafresnaye Collection³) from Trinidad: one adult female (type)—wing, 107; tail, 79; culmen from base, 34; two specimens, *idem*, of undetermined sex—wing, 103, 111; tail, 81, 83; culmen from base, 31, 36.5. The bills of *altirostris* besides being longer are wider and deeper.

This and the following additional new subspecies from the Orinoco

Delta tend to confirm the decided endemism of the avifauna of this heavily forested region which is extensively inundated during the prolonged flood season of the Orinoco River. The actual Delta is approximately 60 kilometers long and 100 wide.

Specimens Examined

X. p. extimus.—PANAMA¹: Agua Dulce, 2♂ 2♀; Garachiné I., 1♂ 1♀.

X. p. dugandi.—COLOMBIA: Honda, 1♂¹.

X. p. picirostris.—VENEZUELA: Paraguaiipoa, 2♂, 2♀; Río Socuy 7♂, 4♀, 1♀ juv., 2(?) ; Santa Cruz de Mara, 1♂, 1♀; Mene Grande, 2(?) ; Casigua, 1♂; Urumaco, 1♂; Dabajuro, 1♂, Curimagua, 1♂; Sabaneta, 1♂, 2♀; Península de Paraguaná, 9♂, 14♀; 3(?) ; Quebrada Arriba, 2♂, 1♀; Carora, 5♂, 5♀, 1(?) .

X. p. saturator.—VENEZUELA: Las Múcuras, 1♀; Santa Rosalía, 1♂; Villa del Rosario, 1♀; Machiques, 2♂, 1♂ juv.; La Sierra, 2♂; Santa Bárbara, 5♂, 2♀; La Fría, 3♂, 1♀, 1(?) ; Ureña, 3♂, 1♀; El Vigía, 5♂, 2♀, 1(?) .

X. p. choicus.—VENEZUELA: Tucacas, 1♂¹; Urama, 2♂, 1♀, 1(?) ; Puerto Cabello, 2♂, 5♀, 1(?) ; Borburata, Puerto Cabello, 1♂ (type); Carenero, 4♂, 1♀; Tacarigua de Mamporal, 1♂.

X. p. longirostris.—VENEZUELA: Isla de Margarita, 14♂, 1♂¹, 10♀, 2♀¹, 3(?) .

X. p. phalara.—VENEZUELA: Guanare, 1♀, 1(?) ; Acarigua, 1♂; Altigracia de Orituco, 2♂, 1♀, 1(?) ; Camaguán, 1♂ 2♀; El Amparo, 1♂, 1♀, 2(?) ; Guasqualito, 7♂, 5♀, 5(?) ; San Fernando de Apure, 2♂, 4♀, 1(?) ; Cabruta, 2♂, 1♀, 1(?) ; Caicara, 5♂, 4♂¹, 5♀, 5♀¹ 1(?) ; Altigracia¹, 2♂, 3♀; Santa María de Ipire, 3♂, 1(?) ; Pariguán, 1♂; Píritu, 1♂; 1♀; Barcelona, 2♂, 3♀, 1(?) ; Puerto de la Cruz, 2♀; Cumaná, 1♂, 5♂¹, 4♀¹; San Antonio del Golfo, 1♂, 2♀, 1(?) ; Carúpano, 1(?) .

X. p. altirostris.—TRINIDAD:³ 1♀ (type), 2(?) .

X. p. picus.—VENEZUELA¹: Ciudad Bolívar, 1♂, 4♀; Agua Salada de Ciudad Bolívar, 1♂, 2♀; Barrancas, 2♂, 2♀, 2♀ juv. BRITISH GUIANA¹: Wakenaan I., 1♀. DUTCH GUIANA¹: Paramaribo, 4♂, 2♀. FRENCH GUIANA: Cayenne, 1♂, 5♂¹, 7♀¹; Approuage¹, 1♂, 1♀. BRAZIL: 141 (var. locs.)¹.

X. p. deltanus.—VENEZUELA: Misión Araguaímujo, 7♂, (incl. type), 3♀, 1(?) ; Sacupana, 1♀¹.

X. p. duidae.—VENEZUELA: Caño Cataniapo, 1♂, 2♀; Sanariapo, 1♂; Isla Ratón, 1♂; Munduapo, 1♀¹; San Fernando de Atabapo, 3♂, 1♀, 1(?) ; pica Yavita-Pimichín, 1♂, 1♀; Las Carmelitas, 2♀; San Juan de Manapiare, 3(?) ; Puerto Yapacana, 3♀; Esmeralda, 3♀; Sabana Grande, 1♂¹; Valle de los Monos¹, 1♂, 1♀; Caño León, 1♂¹.

X. p. bahiae.—BRAZIL: 30 (var. locs.)¹.

X. p. kienerii.—BRAZIL¹: Teffé, 3♂, 4♀.

X. p. peruvianus.—PERU¹: Santa Rosa, 6♂, 1♀; Sarayacu, 1♂.

Glyphorhynchus spirurus amacurensis, new subspecies

Type: From Jobure, Río Jobure, Territorio Delta Amacuro, Venezuela. No. 49749, Phelps Collection, Caracas, Venezuela. Adult male collected

March 8, 1950, by Ramón Urbano. (Type on deposit at the American Museum of Natural History.)

Diagnosis: Differs from all races of *G. spirurus*, except *G. s. spirurus* (Vieillot), by the grayish cast of the forehead; from *G. s. spirurus* differs in paler throat, more yellowish, less ochraceous, and under parts and crown more olivaceous, less brownish; back more brownish, less rufous.

Range: Known only from the Delta of the Orinoco River.

Description of Type: Top of head Raw Umber, forehead with a grayish cast; back Argus Brown; rump and upper tail-coverts Amber Brown; lores grayish, superciliary stripe buffy; auriculars dusky. Chin and throat Pale Orange-Yellow; breast Saccardo's Umber with prominent pale buffy cuneate shaft spots, merging into the paler abdomen which has narrow faint whitish shaft stripes; under tail-coverts more rufous, also with faint shaft stripes. Wings fuscous; primaries and secondaries edged externally with olivaceous, the tertiaries more heavily so with more rufous; a broad buffy white band, medially, across the inner vanes of remiges except the three outermost; alula and exposed portion of upper wing-coverts Snuff Brown, an exposed dusky patch on tips of primary coverts; outer under wing-coverts brownish, inner ones white; axillaries whitish. Tail lighter than Auburn, duller on under surface. Bill (in life) "black, base brownish gray"; feet "brownish gray"; iris "dark". Wing, 71 mm.; tail, 69; culmen from base, 13; tarsus, 16.

Remarks: Sexes alike. Size similar to *spirurus*. Range of measurements: seven adult males—wing, 68-73 (70.6) mm.; tail (4), 65-72 (69); culmen from base, 12-13 (12.8); two adult females—wing, 65-67 (66); tail, 61-65 (63); culmen from base, 13-13 (13). Measurements of *spirurus* from Cayenne: five adult males—wing, 66-72 (69.4); tail, 62-67 (64.2); culmen from base, 13-15 (14); six adult females—wing, 65-67 (65.8); tail (5), 59-65 (63); culmen from base, 13-14 (13.4).

The color of the back, breast and abdomen of the population of *spirurus* inhabiting eastern Bolívar is partially intermediate between topotypical *spirurus* from Cayenne and the new subspecies but most of those specimens can be separated from *amacurensis* by the darker ochraceous throat.

Specimens Examined

*G. s. pectoralis*¹.—MEXICO: Toluca, 1 ♂. GUATEMALA: 1 (♀).

G. s. sublebus.—COSTA RICA: 3⁷. PANAMA: 14⁷. COLUMBIA: 18⁷. ECUADOR: 10⁷. VENEZUELA: La Sierrita, Peripá, 1 ♂; La Fría, 2 ♂; Santo Domingo, 1 ♂; Santa Bárbara, Barinas, 1 ♀.

G. s. spirurus.—VENEZUELA: Cerros Roraima, 1 ♀; Uei-tepui, 1 ♂; Ptari-tepui, 1 ♂, 1 ♀; Chimantá-tepui, 1 ♂, 1 (♀) Uaipán-tepui, 2 ♂, 2 (♀); Aprada-tepui, 3 ♂, 1 ♀; Auyan-tepui, 3 ♂, 1 ♀; Kabanayén, 3 ♂, 1 (♀); Boca Caño Pácara, 1 ♂; Campo Urimán, 1 (♀); Carabobo, Río Cuyuni, 4 ♂¹, 1 ♀, 1 (♀); Camborere, 4 ♂, 1 (♀); Nuria, 9 ♂, 5 ♀, 2 (♀). BRITISH GUIANA: 28⁷, Paruima Mission, 1 ♀. FRENCH GUIANA¹: Ipousin, 7 ♂, 5 ♀; Roche Marie, 1 ♂; Cayenne, 1 ♂, 1 ♀. BRAZIL: 14⁷.

G. s. amacurensis.—VENEZUELA: Jobure, 7 ♂ (incl. type), 2 ♀, 5 (♀); San Francisco de Guayo, 2 (♀).

⁷Specimens in the American Museum of Natural History. For localities see Zimmer, Am. Mus. Nov., No. 757, pp. 6, 7, Nov. 30, 1934.

G. s. rufigularis.—VENEZUELA: La Faisca, Cerro Paurai-tepui, 7 ♂, 3 ♀, 4(?) ; La Candelaria, 1 ♀ ; El Polaco, 1 ♂ ; Salto Arebuchi, 1 ♂ ; Río Icabarú, 1 ♂ ; Cerro Guaiquinima, 4 ♂, 1 ♀, 3(?) ; Salto Guaiquinima, 6 ♂, 2 ♀ ; Río Carún, 1 ♀ ; Salto María Espuma, 1 ♀, 1(?) ; Salto Maisa, 3 ♂, 2(?) ; Río Tonoro, 1 ♀, 1(?) ; Cerro Tigre, 1(?) ; Río Mato, Río Caura, 1 ♂, 9 ♀ ; Salto Pará, 4 ♂, 1 ♀, 1(?) ; Boca Chanaro, 1 ♀ ; Río Mauo, 1 ♂ ; Maniña, 1 ♂, 3 ♀, 1(?) ; Sarariña, 1 ♂ ; Sabana Canaracuni, 2 ♂ ; Cerro El Negro, Río Cuchivero, 3 ♂ ; Santa Rosalía, 3 ♂ ; Caño Cataniapo, 4 ♂, 2 ♀, 3(?) ; Sanariapo, 1 ♂ ; Caño Cuao, 1(?) ; San Fernando de Atabapo, 1 ♂, 1 ♀ ; Pica Yavita-Pimichín, 8 ♂, 3(?) ; Las Carmelitas, 7 ♂, 1 ♀, 4(?) ; Kabadisocaña, 2 ♀ ; Chajuraña, 1 ♂, 1 ♀, 1(?) ; Puerto Yapacana, 1 ♂, 2(?) ; Alto Río Asisa, 4 ♂, 2(?) ; Cerro Parú, 1 ♂ ; San Carlos, 1(?) ; El Carmen, 2 ♂, 1 ♀ ; nacientes Río Siapa, 1 ♂. BRASIL: 47⁷ ; Boca Río Castanho, Río Padauri, 1 ♀ ; Base Canoas, Río Castanho, 1 ♂. ECUADOR: 7⁷.

G. s. castelnaudi.—PERU: 39. ECUADOR: 8. BRAZIL: 17.

G. s. albigularis.—BOLIVIA: 2⁷.

G. s. inornatus.—BRAZIL 10⁷.

G. s. cuneatus.—BRAZIL: 31⁷.

Myrmotherula behni camanii, new subspecies

Type: From Cerro Camani, Territorio Amazonas, Venezuela; 1250 meters. No. 52367, Phelps Collection, Caracas, Venezuela. Adult female collected February 15, 1951, by Ramón Urbano. (Type on deposit at the American Museum of Natural History.)

Diagnosis: Differs from the females of *M. b. inornata* Selater and *M. b. yavii* Zimmer and Phelps by pale olivaceous upper parts instead of rufous brown; under parts more olivaceous, less brownish. The male differs from *yavii* in paler gray upper parts and the crown uniform with the back without the blackish tips to the feathers.

Range: Known only by a male and a female from Mt. Camani near the upper Manapiare River, an affluent of the Ventuari, in the Sub-tropical Zone (1250 m.).

Description of Type: Top of head Light Brownish Olive, merging into the Medal Bronze of back and uropygium; lores grayish; sides of head grayish olive. Chin and throat whitish; breast, sides and abdomen Deep Olive Buff, merging into the Dark Olive Buff of flanks; under tail-coverts Tawny-Olive. Wings Benzo Brown; primaries and secondaries edged outwardly with grayish brown; tertials and upper wing-coverts heavily edged with Argus Brown; remiges narrowly edged on inner webs, basally, with buffy white. Tail Benzo Brown, the rectrices heavily edged outwardly with Argus Brown. Bill (in life) 'black, base of mandible brownish flesh'; feet 'brownish gray'; iris 'dark'. Wing 54 mm.; tail, 37; culmen from base, 14; tarsus, 16.

Remarks: Sexes different in color. Size similar to *yavii*. Measurements of the adult male from Cerro Camani: wing, 58 mm.; tail, 36; culmen from base, 15; tarsus, 15.

The unique male differs from *yavii* as in diagnosis. Measurements: wing, 58; tail, 38; culmen from base, 15; tarsus, 16.

Specimens Examined

M. b. inornata.—VENEZUELA: Arabupu, Cerro Roraima, 1♂, 1♂ juv., 1♀.

M. b. yavii.—VENEZUELA: Cerro Yaví, 1♂, 1♂ juv., 2♀; Cerro El Negro, alto Río Cuchivero, 1♂; Cerro Parú, 1♂.

M. b. camanii.—VENEZUELA: Cerro Camani, 1♂, 1♀ (type).

Pipromorpha oleaginea dorsalis, new subspecies

Type: From Cerro Roraima, Gran Sabana, Estado Bolívar, Venezuela; 1840 meters. No. 50356, Phelps Collection, Caracas, Venezuela. Adult of undetermined sex collected February 8, 1950, by Manuel Castro. (Type on deposit at the American Museum of Natural History.)

Diagnosis: Differs from all forms of *P. oleaginea* by darker green upper parts, less yellowish tint; differs additionally from *P. o. intensa* Zimmer and Phelps from southeastern Bolívar, by paler abdomen and grayer, less yellowish tint on throat and breast.

Range: Known only by the type from Mt. Roraima, in the Subtropical Zone, at 1840 meters.

Description of Type: Top of head, back and rump Olive-Green, merging into the Warbler Green of upper tail-coverts; sides of head more grayish. Throat grayish olive merging into the more brownish of breast and sides, which merges into the Honey Yellow of abdomen, flanks and under tail-coverts. Wings Clove Brown; remiges, except outermost, narrowly edged externally with olivaceous, tertials more widely so and whitish; greater and lesser wing-coverts edged and tipped with buffy olive forming two indistinct bands; bend of wing Chamois; under wing-coverts and axillaries darker than Ochraceous-Buff; inner webs of remiges with pale buffy edgings except terminally. Tail Olive-Brown, the rectrices edged externally with Warbler Green. Maxilla (in life) "black"; mandible (in dried skin) flesh with black tip; feet (in life) "dark gray"; iris "brown". Wing, 63 mm.; tail, 46; culmen from base, 13.5; tarsus, 16.

Remarks: Size similar to *P. o. intensa*. Measurements of five adult males of *intensa*: wing, 63-66(63.8) mm.; tail, 48.5-50(49.3); culmen from base, 13-14(13.2).

This must be an extremely rare species on Mt. Roraima where many expeditions have hitherto failed to collect it. The other subspecies in Venezuela are of the Tropical Zone.

Specimens Examined

P. o. oleaginea.—BRAZIL⁸: 1.

P. o. chloronota.—BOLIVIA⁸: 3. BRAZIL: 42⁸; Rio Castanho, Rio Padauri, 1♂. COLOMBIA⁸: 13. VENEZUELA: 44⁸; El Carmen, Río Negro, 2♂, 3(?) ; San Carlos 1(?) ; Cerro Yapacana, 2♂, 2♀, 2(?) ; Sabana, Alto Río Asisa, 3♂, 1♀, 1(?) ; Las Carmelitas, 1♂, 1(?) ; Caño Cuao, 1♂; Sanariapo, 1♂; Caño Cataniapo, 3♂; Raudal Alto, Río Cuchivero, 1♂; Santa Rosalía, 1♂, 1♀, 2(?) ; Puerto Carretico, Río

⁸Specimens in the American Museum of Natural History. For localities see Zimmerman, Am. Mus. Nov., No. 1126, pp. 13, 14, 1941.

⁹*idem*. For list of localities see Zimmer and Phelps, Am. Mus. Nov., No. 1812, p. 17, 1946.

Mato, 2♂, 1♀; Barinitas, 1♀; Ciudad Bolivia, 2♂, 1♀; Santa Bárbara, 1(♀); Santo Domingo, 1♂, 2♀.

P. o. haurwelli^s.—ECUADOR: 28. PERU: 10.

P. o. maynana.—PERU^s: 19.

P. o. pacifica.—ECUADOR^s: 17.

P. o. wallacei^s.—BRAZIL: 46. FRENCH GUIANA: 2. DUTCH GUIANA: 8. BRITISH GUIANA: 6.

P. o. dorsalis.—VENEZUELA: Cerro Roraima, 1(♀) (type).

P. o. intensa.—VENEZUELA: Carabobo, Río Cuyuni, 2(♀); Camborere, 1♂; Cerro Chimantá-tepui, 1(♀); Caño Pácara, Río Caroní 1(♀); Urimán, 1♂, 1♀; Campamento Comején, Cerro Guaiquinima, 2♂; Salto Maria Espuma 2♂, 2(♀); Salto Maisa, 3♂ (incl. type), 2♀, 3(♀); Salto El Payaso, 1♀, 1(♀); Raudal Capuri, 1♀, 1(♀); Raudal Caranca, 1(♀); Río Arawa, Alto Caura 1♂; Sabana Canaracuni, 1♂, 1♀; Chajuraña, Alto Ventuari, 1(♀). BRITISH GUIANA: Paruima Mission, Río Kamarang, 1♀.

P. o. pallidiventris.—VENEZUELA: 28^s; Cristóbal Colón, 1♂; Cerro Azul, 1♀; Yaguaraparo, 1♂, 1♀; Tunapui, 1♂; El Pilar, 1♂, 2(♀); Quebrada Bonita, 1♀, 1(♀); Los Altos, 4♂, 1(♀); Bergantín, 1♂; Misión Araguaimujo, Delta del Orinoco, 1(♀); Caño Dabomana, 1(♀); Jobure, 3♂. TRINIDAD^s: 14. TOBAGO^s: 1.

P. o. parca.—VENEZUELA: La Fría, 3♂, 1(♀); El Vigía, 2♂, 2♀; La Sierra, Perijá, 2♂, 1(♀); La Sabana, 1♂. COLOMBIA^s: 40. PANAMA^s: 13.

P. o. lutescens.—PANAMA^s: 27.

P. o. dyscola.—PANAMA^s: 24.

P. o. assimilis^s.—COSTA RICA: 10. NICARAGUA: 14. GUATEMALA: 53. MEXICO: 4.

*List of Localities*

- | | | | |
|-----|-----------------------|-----|-------------------|
| 31 | Acarigua | 64 | Azul, Cerro |
| 75 | Agua Salada de Ciudad | 54 | Barcelona |
| | Bolívar | 27 | Barinitas |
| 115 | Altagracia | 69 | Barrancas |
| 50 | Altagracia de Orituco | 55 | Bergantín |
| 27 | Altamira (Barinas) | 14 | Boca de Monte |
| 118 | Alto, Raudal | 44 | Borburata |
| 90 | Aprada-tepui, Cerro | 12 | Bramón |
| 83 | Arabupú | 116 | Cabruta |
| 70 | Araguaimujo, Misión | 117 | Caicara (Bolívar) |
| 104 | Arawa, Río | 65 | Camaguán |
| 87 | Arebuchi, Salto | 122 | Camani, Cerro |
| 22 | Aricagua, Páramo | 80 | Camborere |
| 126 | Asisa, Alto Río | 99 | Canaracuni |
| 93 | Auyan-tepui, Cerro | 94 | Capuri, Raudal |

79	Carabobo	18	Guasqualito
95	Caranca, Raudal	130	Huachamacare, Cerro
52	Carenero	86	Icabarú, Río
109	Caroní, Río	48	Izcaragua, Hacienda
35	Carora	73	Jobure
112	Carretico, Puerto	73	Jobure, Río
95	Carún, Río	102	Kabadisocaña
61	Carúpano	81	Kabanayén
36	Casigua	83	Kukenám, Cerro
134	Casiquiare, Caño	85	La Candelaria, Mina
136	Castanho, Río (Brazil)	24	La Culata, Páramo
144	Cataniapo, Caño	85	La Faisca, Mina
111	Caura, Río	10	La Fría
32	Cendé, Páramo	108	La Paragua
103	Chajuraña	7	La Sabana
105	Chanaro, Boca Río	7	La Sierra
88	Chimantá-tepui, Cerro	128	Las Carmelitas
75	Ciudad Bolívar	4	Las Múcuras
25	Ciudad Bolivia	44	Las Quiguas
46	Colonia Tovar	133	León, Caño
106	Comején, Campamento	56	Los Altos
21	Conejos, Páramo	6	Machiques
129	Corocoro, Isla	143	Maipures (Colombia)
64	Cristóbal Colón	96	Maisa, Salto
142	Cuao, Caño	121	Manapiare, Río
113	Cuchivero, Río	100	Maniña
58	Cumaná	8	Maracaibo, Lago
132	Cunucunuma, Río	60	Margarita, Isla de
74	Curiapo	97	María Espuma, Salto
40	Curimagua	112	Mato, Río
78	Cuyuni, Río	98	Mauo, Río
37	Dabajuro	33	Mene Grande
72	Dabomana, Caño	23	Mérida
131	Duida, Cerro	29	Misisí, Páramo
17	El Amparo	23	Mantañas
137	El Carmen	26	Mucuchíes, Páramo
46	El Junquito	141	Munduapo
118	El Negro, Cerro	47	Naiguatá, Pico de
76	El Palmar	123	Negro, Caño
94	El Payaso, Salto	50	Negro, Cerro (Miranda)
62	El Pilar	32	Niquitáz, Cerro
85	El Polaco, Mina	77	Nuria
20	El Vigía	89	Pácara, Boca Caño
133	Esmeralda	134	Pacila, Río
49	Golfo Triste, Cerro	110	Pará, Salto
82	Gran Sabana	41	Paraguaná, Península de
106	Guaiquinima, Cerro	108	Paragua, Río
106	Guaiquinima, Salto	1	Paraguaipoa
30	Guanare	68	Pariaguán
124	Guanay, Cerro	127	Parú, Cerro
62	Guaraunos	125	Parú, Río
48	Guarenas	119	Parucito, Caño

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|-----|--------------------------------|-----|-------------------------|
| 85 | Paurai-tepui, Cerro | 5 | Santa Rosalía (Zulia) |
| 53 | Píritu | 13 | Santo Domingo (Táchira) |
| 81 | Ptari-tepui, Cerro | 101 | Sarariña |
| 44 | Puerto Cabello | 135 | Siapa, nacientes Río |
| 56 | Puerto de la Cruz | 2 | Socuy, Río |
| 34 | Quebrada Arriba | 81 | Sororopán-tepui, Cerro |
| 57 | Quebrada Bonita | 23 | Tabay |
| 15 | Queniquea | 51 | Tacarigua de Mamporal |
| 45 | Rancho Grande | 12 | Tamá, Páramo |
| 143 | Ratón, Isla | 108 | Tigre, Cerro |
| 83 | Roraima, Cerro | 28 | Timotes |
| 126 | Sabana (Río Asisa) | 76 | Tomasote, Cerro |
| 133 | Sabana Grande | 107 | Tonoro, Río |
| 39 | Sabaneta | 42 | Tucacas |
| 71 | Sacupana | 62 | Tunapui |
| 59 | San Antonio del Golfo | 92 | Uaipán-tepui, Cerro |
| 138 | San Carlos (Amazonas) | 84 | Uei-tepui, Cerro |
| 66 | San Fernando de Apure | 43 | Urama |
| 140 | San Fernando de Atabapo | 11 | Ureña |
| 72 | San Francisco de Guayo, Misión | 91 | Urimán, Campo |
| 23 | San Jacinto | 38 | Urumaco |
| 48 | San José de Los Caracas | 24 | Valle |
| 121 | San Juan de Manapiare | 133 | Valle de los Monos |
| 143 | Sanariapo | 128 | Ventuari, Río |
| 9 | Santa Bárbara (Zulia) | 12 | Villa Páez |
| 16 | Santa Bárbara (Barinas) | 4 | Villa del Rosario |
| 3 | Santa Cruz de Mara | 63 | Yaguaraparo |
| 19 | Santa Cruz de Mora | 129 | Yapacana, Cerro |
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| 114 | Santa Rosalía (Bolívar) | 120 | Yaví, Cerro |
| | | 139 | Yavita-Pimichín, Pica |

PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON

MISCELLANEOUS NEW NORTH AMERICAN CENTIPEDES OF
THE ORDER LITHOBIIDA

BY RALPH V. CHAMBERLIN AND YU-HSI M. WANG

The new genera and species of Lithobiid centipeds described in the present paper were noted in the course of examination of several miscellaneous lots of chilopods in the collection of the senior author where all types are for the present deposited.

Family LITHOBIIDAE

Genus **CALCIBIUS**, new genus

In general agreeing with *Oabius*, like which it has the tarsi undivided in all but the posterior legs. Articles of antennae 20 and prosternal teeth 2 + 2. None of the dorsal plates produced. Separated from *Oabius* because of the presence (in the male only ?) of a low swelling or lobe on the mesal side of the distal end of the fourth joint of the anal legs, this lobe bearing an especially large mesally directed spine or spur.

Genotype.—*Calcibius calcarifer* new species.

Calcibius calcarifer new species

General color pale yellow throughout.

Antennae short; articles 20. Ocelli in two short series, thus, 2,2.

Prosternal teeth small, pale, 2 + 2.

Ventral spines of the anal legs, 0,1,3,3,0; dorsal spines, 1,0,2,0,0; in addition, at least in the male, a much larger and characteristic spine borne at distal end of the fourth joint, the spine extending mesad and curving somewhat proximad. Dorsal spines of the penult legs 1,0,2,1,1.

Length, 6.2 mm.

Locality.—Washington: Ellensburg.

Type.—One male taken Aug. 29, 1929, by R. V. Chamberlin.

Enarthrobium oblitus new species

Dorsum light brown, the caudal border of principal tergites darker. Legs dull yellow. Head and prehensors more or less orange in color.

Antennae of moderate length, the articles mostly 26 in number. Ocelli small and pale. Typically in three longitudinal series; e.g., 1 + 5,5,5.

Prosternal teeth 2 + 2.

Posterior angles of ninth, eleventh and thirteenth dorsal plates produced.

Dorsal spines of anal legs, 1,0,3,1,0; ventral spines, 0,1,3(4),2,1; the claw single. Dorsal spines of penult legs, 1,0,3,1,1; central spines, 0,1,3,3,1½ one small accessory claw present. Dorsal spines of the

thirteenth legs, 1,0,3,1,1; ventral, 0,1,3,3,2. None of the coxae laterally armed. Ventral spines of first legs, 0,0,2,3,2.

Coxal pores slightly elliptic; 5,6(5),6,5.

In the male the fourth joint of the anal legs bears at its distal end above a small but distinct lobe.

The claw of the genital forceps of the female tripartite; the basal spines 2 + 2, these long and subcylindric to the short, acute tip.

Length, 18 mm.

Locality.—California: Claremont.

Type.—Three males and two females.

In lacking lateral spines on the posterior coxae and in most other respects close to *E. bullifer* Chamb., occurring in South Carolina. Separated from that species on the basis of differences in the spining of the legs, the new species having the ventral spines of the anal legs 0,1,3,(4),2,1 instead of 0,1,3,2,0 and the ventral spines of the first legs 0,0,2,3,2 instead of 0,0,1,3,1.

***Nadabius pluto* new species**

Dorsum light chestnut, head and prehensors darker. Legs yellowish.

Antennae of moderate length, composed of 20 articles which decrease in length distad to the penult article, the ultimate article being long as usual. Ocelli in three series; e.g., 1 + 4,4,3, with the single ocellus much the largest.

Prosternal teeth, 2 + 2.

Ventral spines of first and second legs, 0,0,1,3,2; dorsal spines, 0,0,1,2,1. Dorsal spines of twelfth and thirteenth legs, 1,0,3,1,0. Dorsal spines of penult legs 1,0,3,1,1; ventral spines, 0,1,3,3,2; the claw armed. Dorsal spines of anal legs, 1,0,3,1,0; ventral spines, 0,1,3,3,1; the claw single. Last two pairs of coxae laterally armed.

Anal legs of the male with tarsus bearing a typical keel at distal end above.

Claw of female genital forceps tridentate; the basal spines 2 + 2, these rather short and broad.

Length, 9-10 mm.

Locality.—Montana: Hell Gate River.

Type.—Several males and females taken Aug. 13, 1929, by R. V. and Edith S. Chamberlin.

Closely related to *N. mesechinus* Chamb. of Oregon, but differing in having the ventral spines of the anal legs 0,1,3,3,1 instead of 0,1,3,2,0 as well as in the spining of the first two pairs of legs.

***Nadabius vaquens* new species**

Dorsum light brown, the venter and legs paler as usual.

Antennae short, composed of 20 articles.

Prosternal teeth 2 + 2, small; the margin running obliquely from the outer tooth on each side in a laterocaudal direction.

None of the dorsal plates produced.

Ventral spines of the anal legs 0,1,3,2,0; dorsal, 1,0,3,0,0; claw single. Ventral spines of penult legs, 0,1,3,3,1; dorsal spines, 1,0,3,1,0; claw armed. None of the coxae laterally armed.

In the anal legs of the male the fourth and fifth articles are swollen; the dorsal keel at the distal end of joint 4 rather long but low.

Length, 9 mm.

Locality.—Wyoming: Yellowstone Park at Mt. Washburn.

Type.—One male taken Aug. 13, 1940.

***Paitobius (Tunabius) zygethus* new species**

Dorsum light brown, venter and legs paler.

Antennae composed of 27-28 articles. Ocelli distinct, arranged in three or four longitudinal series.

Prosternal teeth 2 + 2, the line of their apices straight.

Posterior angles of the eleventh and thirteenth plates produced but only slightly so.

Ventral spines of anal legs 0,1,3,2,0; dorsal, 1,0,3,1,0; claw single. Ventral spines of penult legs, 0,1,3,3,2; dorsal spines 1,0,3,1,1; claws 2. Last three pairs of coxae laterally armed.

Claw of female genital forceps tripartite; basal spines 2 + 2, broad, widest toward the dark colored, dentate apex.

Length, 13 mm.

Locality.—California: no more definite locality recorded. Female holotype and one male.

In form of basal spines of the female gonopods resembling *Taiyubius* rather than typical *Paitobius* but differing from the known species of the former genus in not having the posterior corners of the ninth tergite at all produced. It differs from the previously known species of *Paitobius*, subgenus *Tunabius*, in having the anal claw single and in having the ventral spines of the penult legs 0,1,3,3,2.

***Pokabius (Pokabius) iosemiteus* new species**

General color yellow, the legs paler.

Antennae short. Ocelli in a principal series of 5 or 8 above which one or two much larger ocelli.

Prosternal teeth pale, small, 2 + 2.

None of the dorsal plates with posterior angles produced.

Dorsal spines of anal legs in the male, 1,0,1,1,0, in the female, 1,0,2(3),1,0; ventral spines, 0,1,3,2,0. Dorsal spines of penult legs, 1,0,3,1,1; ventral spines, 0,1,3,3,1. Posterior coxae not laterally armed.

The fourth joint of the anal legs in the male especially crassate, the dorsal process at its proximal end in the form of an exceptionally long, horn-like process which curves mesoproximad above its base, its end flattened, with margin rounded and setose.

Claw of the female gonopods tridentate, the teeth not pronounced. Basal spines 2 + 2.

Length, 8-9.5 mm.

Locality.—California: Yosemite National Park.

Type.—One male and one female.

Probably nearest to *P. disantus* Chamb., occurring in Los Angeles and adjacent counties, but widely different in the prolonged process of the fourth article of the anal legs in the male.

Genus *PLANOBIUS*, new genus

Apparently closely related to *Nampabius*, but a much larger form than species of that genus, differing in having the posterior coxae spines both laterally and dorsally and in the stronger spining of anal and penult legs. These legs similarly bear two claws. The male is similar to *Nampabius* in bearing a characteristic process at the distal end of the

fifth article of the penult legs, but the process arises well down on the side of the joint rather than dorsally.

Generotype.—*Planobius aletes* new species.

***Planobius aletes* new species**

The articles of antennae 20 in number. Ocelli few, pale.

Prosternal teeth 2 + 2.

Posterior angles of none of the dorsal plates produced.

Ventral spines of anal legs 0,1,3,3,1; dorsal, 1,0,3,1,0; claws 2. Ventral spines of penult legs (in the male), 0,1,3,2,0; dorsal, 1,0,3,1,1; claws 2. Last two pairs of coxae armed laterally as well as dorsally.

Penult legs of the male with first joints conspicuously inflated but the last two joints abruptly thinner, the fourth joint thickest. The process of the fifth article located at the distal end midway down the side and projecting alongside of base of the sixth article, the process widening a little clavately distad and truncate at the end.

Length, about 13 mm.

Locality.—Not recorded.

Type.—One male.

***Sigibius siopius* new species**

Brown to chestnut, with posterior end of body lighter and the corresponding legs pale yellow.

Articles of antennae typically near 25. Ocelli very few, mostly two or three in a single series.

Prosternal teeth normal.

Differing from the related American species in having the claw of the anal legs single. Ventral spines of anal legs 0,1,1,1,0; dorsal, 0,0,1,1,0; claws 2, the accessory claw small and fine. Dorsal spines of thirteenth legs, 0,0,1,0,0; ventral, 0,1,1,1,1.

Claw of genital forceps short and proportionately broad, bidentate, the teeth short. Basal spines 2 + 2.

Length, 6 mm.

Locality.—Utah: Provo (May 22, 1942) and Salt Lake Valley along the Jordan River (May 11, 1946).

Type.—Many specimens of both sexes.

***Simobius opibius* new species**

Readily distinguished from *S. ginampus*, the generotype, in having the prosternal teeth 4 + 4 instead of 2 + 2, as well as in having the ventral spines of the penult legs 0,1,3,3,1, instead of 0,1,3,3,2, with two claws instead of three, and apparently also in having the ventral spines of the anal legs 0,1,3,3,0, but the spine on the fifth joint may possibly have been lost from the type.

The anal and penult legs in the male are crassate, the anal legs otherwise unmodified; the dorsal eminence at distal end of fifth joint of the penult legs low and broad, shaped much like the typical keel in the anal legs of *Nadabius*, thus contrasting with the sub-cylindrical process on *ginampus*.

Length,—10 mm.

Locality.—California: Muir Woods.

Type.—Two males and an immature female taken Sept. 5, 1927.

Sozibius mullanua new species

General color-yellow, with head, antennae and prehensors darker.

Ocelli large, few in number, being typically 2,2 or 1 + 1,2.

Third joint of first pairs of legs having but 2 dorsal spines. Ventral spines of anal legs 0,1,3,2,0; dorsal, 1,0,3,1,0; claw single. Ventral spines of penult legs 0,1,3,3,1; dorsal, 0,0,3,1,0. None of coxae laterally armed.

Length, 11 mm.

Locality,—Idaho: Mullan.

Type.—One male taken Aug. 17, 1929, by R. V. and E. S. Chamberlin.

This is the first record of *Sozibius* from west of Arkansas. The present species is distinguishable from *S. pennsylvanicua*, apparently the most clearly related to it of the known forms, in lacking a lateral spine on the posterior coxae, in having the ventral spines of the anal legs 0,1,3,2,0 instead of 0,1,3,3,2, and the ventral spines of the first legs 0,0,1,1,1 instead of 0,0,2,2,1.

Sonibius scepticus new species

Articles of the antennae 20, these of moderate length. Ocelli in four series; e.g., 1 + 5,4,4,3.

Prosternal teeth 4 + 4, the one at mesal end on each side reduced in size.

Posterior angles of ninth, eleventh and thirteenth dorsal plates produced, the process of thirteenth distinct, those of ninth and eleventh weak.

Anal legs with ventral spines 0,1,3,2,0, a minus accessory claw; dorsal spines, 1,0,3,1,0. Ventral spines of penult legs 0,1,3,3,1; dorsal, 1,0,3,1,1.

Claw of the female genital forceps tridentate, the lobes blunt. Basal spines 2 + 2, proportionately short and broad.

Length, 14 mm.

Locality.—New York: Wilmington Notch.

Type.—One female taken Aug. 26, 1921.

This is a larger form than species previously referred to this genus and differs in having the prosternal teeth 4 + 4 instead of 2 + 2 or 3 + 3 and in the notably weaker development of the processes on the ninth, eleventh and thirteenth dorsal plates, especially on the first two of these.

Zinapolys (Pygmobius) uticola new subgenus and species

General color yellowish, a brighter, more orange, color at anterior and posterior ends, inclusive of head. Legs and antennae pale yellow.

Antennae short, composed normally of 20 articles but in the type specimen there are but 15 on one side. Ocelli few, arranged in two series, 4 + 2, with no single ocellus distinctly set off.

Prosternal teeth 4 + 4.

Posterior angles of ninth, eleventh and thirteenth dorsal plates produced.

Ventral spines of anal legs 0,1,3,3,1; dorsal spines, 0,1,3,1,0; claw single. Ventral spines of penult legs, 0,1,3,1,0; dorsal spines 0,0,3,1,0; claw unarmed. Last two pairs of coxae armed laterally and the last pair also ventrally.

Length, 6 mm.

Locality.—Utah: Daniel's Canyon.

Type.—One male taken by S. Mulaik on Oct. 15, 1939.

Placed in a separate subgenus primarily on the basis of the presence of processes on ninth, eleventh and thirteenth dorsal plates. It is a much smaller species than the known members of *Zinapolys* sens. str.

Family GOSIBIIDAE

Gosibius (Abatobius) auxodontus new species

Dorsum brown or somewhat chestnut. Most legs paler but the posterior pairs light chestnut.

Antennae composed of 20 long articles. Ocelli with single ocellus enlarged, the others in four series; e.g., 1 + 5, 4, 3, 2.

Prosternal teeth distinctive among the species of the genus as now known in their larger number, being 4 + 4; the outermost tooth on each side separated by a wider space or diastema than the intervals between the other teeth.

Posterior angles of none of the dorsal plates produced.

Ventral spines of first legs, 0, 0, 1, 1, 1. Ventral spines of the penult legs 0, 1, 3, 2, 1; dorsal, 0, 0, 3, 2, 1; claw armed. Ventral spines of anal legs 0, 1, 3, 2, 1; dorsal, 1, 0, 3, 1, 0; claw single. None of the coxae laterally armed.

The claw of the genital forceps long, acute and strictly entire. Basal spines 2 + 2, long and acuminate. First article enlarged, excavated on mesal side at base as usual.

Length, 15 mm.

Locality.—Uncertain, but probably Utah or an adjacent area.

Apparently an aberrant member of *Gosibius* among the species of which it is distinct especially in the larger number of prosternal teeth and the lesser number of antennal articles.

Gosibius (Gosibius) submarginis new species

The type, which is probably not in full color, is pale yellowish throughout.

Articles of antennae 23. Ocelli small; 1 + 4, 3, 3.

Prosternal teeth small, 3 + 3; the ectal spine slender but stouter than the ordinary setae, well removed from the ectal tooth on each side.

Posterior angles of ninth, eleventh and thirteenth tergites produced, the processes of the ninth plate broad and short, those of eleventh more produced and those of the thirteenth well developed.

Dorsal spines of anal legs 1, 0, 3, 2, 0; ventral, 0, 1, 3, 3, 1; the claw single. Ventral spines of the penult legs 0, 1, 3, 3, 2; dorsal spines 1, 0, 3, 2, 2; claws three.

In the male the fourth and fifth joints of both the anal and the penult legs are conspicuously crassate leaving the two last joints abruptly thinner.

Length, 15 mm.

Locality.—Washington, between Seattle and Everett.

Type.—One male, taken in August.

Related to *G. brevicornis*, but the male differing in having the special setose eminence on the fifth article of the penult legs much reduced and located farther distad. The fourth and fifth articles more conspicuously swollen.

Genus **SHOSBIUS**, new genus

A genus of the Gosibiidae most closely related to *Abatobius* but differing in having the prosternal teeth 5 + 5 instead of 2 + 2, in having the articles of the antennae fixed at 20, and in the presence of the prominent lobe from the first article of the female gonopods.

Generotype.—*Shosobius cordialis* new species.

Shosobius cordialis new species

Articles of the antennae twenty in number, these of moderate length.

Head without distinct marginal interruptions. Ocelli few, typically in three series, the single ocellus large and those of the upper two rows larger than those of the bottom row; 1 + 1, 2m4.

Prosternal teeth 5 + 5, the dental lines of the two sides meeting at the middle in an obtuse angle; ectal spine setiform, inserted adjacent to the tooth on each side.

Posterior angles of none of the dorsal plates produced.

Coxal pores transverse, 6,7,7,6.

Coxa of anal legs armed laterally and dorsally. Dorsal spines of twelfth legs, 0,0,3,2,2; ventral, 0,1,3,3,2. (Legs 13 to 15 missing from type specimen).

Claw of female genital forceps entire, broad. Basal article of gonopod produced mesodistad into a conspicuous lobe bearing, in the type, but a single, proportionately broad, spine but a second spine may have been lost; this article excavated and sclerotized on mesal side at base.

Length 13 mm.

Locality.—Idaho: Cour de Elaine.

Type.—One female taken Sept. 4, 1949, Wallace; and a female and immature male taken Sept. 3, 1949, by S. Mulaik.

Family **ETHOPOLIDAE**

Zygethopolys pugetensis tiganus new variety

Set apart from typical *pugetensis* in having the claw of the female gonopods distinctly tripartite, with the mesal tooth much smaller than the median instead of being subequal to it and also in having the basal spines of the gonopods 3 + 3 instead of 2 + 2. The prosternum agrees with that of the species in having but one tooth (in one case 2 on one side) ectad of the diastema. The teeth mesad of the diastema on each side 5 or 6 in number.

Length, 18 mm.

Locality.—British Columbia: Vancouver.

Type.—One male and one female taken April 4, 1933, by H. Leech.

PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON

TWO NEW SPECIES OF *ARTHROGORGIA* (GORONACEA:
PRIMNOIDAE) FROM THE ALEUTIAN ISLANDS REGION

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Among the octocorals obtained by the U. S. Fish Commission steamer "Albatross" during the Northwestern Pacific Cruise of 1906 are two new species of primnoid corals belonging to the subfamily Calyptrophorinae. Because of the primitive characters which they possess, both are of more than usual interest and may serve to shed more light upon relationships within the Primnoidae. The members of this family, especially those native to the waters of Japan, have been studied extensively by the late Kumao Kinoshita, whose phylogenetic considerations concerning primnoids were published in the *Dobutsugaku Zasshi* (Tokyo) during 1908 and 1909. I am especially indebted to Mr. Hirohiko Otsuka, of Tokyo, who has translated these papers from the original Japanese, thus making their contents available to me for this and other studies in progress.

Genus *Arthrogorgia* Kükenthal

Calyptrophora (part) Kinoshita 1907, p. 234.

Arthrogorgia Kükenthal in: Kükenthal & Gorzawski 1908a, p. 625; Kükenthal & Gorzawski 1908b, p. 28; Kükenthal 1919, p. 476; Kükenthal 1924, p. 319.

Calyptrophora (*Arthrogorgia*) Kinoshita 1908, p. 59; Kinoshita 1909, p. 7.

This genus, originally proposed by Kükenthal for the species *Arthrogorgia membranacea* Kükenthal 1908 [= *Calyptrophora ijimai* Kinoshita 1907], was distinguished from *Calyptrophora* Gray on the basis of its three abaxial and two adaxial pairs of infrabasal scales and its regular pinnate branching. The two new species described below characteristically possess multiple infrabasals, but are not regularly pinnate in branching. However, since the manner of branching in this family is so diverse that it can only be considered secondary to the zooidal spiculation, these new species will fall within the limits of the genus *Arthrogorgia*, a modified diagnosis of which may read as follows:

Primnoids with zooids in whorls; zooid body enclosed by two pairs of large abaxial scales; infrabasals more than two pairs; distal adaxial

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body scales present; marginal scales (between opercular and major body scales) present in some or all longitudinal rows. Operculum high and prominent. Branching pinnate or dichotomous.

Type (by monotypy).—*Arthrogorgia membranacea* Kükenthal = *Calyptrophora iijimai* Kinoshita 1907.

***Arthrogorgia kinoshitai* sp. nov.**

Pl. 2, figs. 1-8; Pl. 3, figs. 1-12.

Description.—The colony is large and dichotomously branched in one plane. The dichotomy is not entirely regular, since one branch of a fork often fails to bifurcate when its neighbor does, continuing instead as an unbranched end twig as much as 30 cm. in length. The shorter end twigs are as little as 9 cm. long. The axis is round, longitudinally striated, 4 mm. in diameter at its lowest part. It is brown in color proximally, becoming paler distally, and with a distinct metallic sheen throughout. In the coenenchyma surrounding the axis there is a ring of primary longitudinal stem canals, about 11 in number in the twigs and increasing basally. The canal walls and the tissue surrounding the axis lack spicules. The zooids, which face downward, are arranged in whorls of six (distally) to eight or nine (proximally). In 3 cm. of axis length there are usually seven or eight whorls very closely placed (Pl. 2, fig. 1).

The zooids (Pl. 2, figs. 2, 3) show a certain degree of variation in size, fully formed individuals ranging in height (contracted) from 3.0 to 3.5 mm., measured parallel to the axis. The zooidal spiculation consists of two pairs of large, abaxial body scales, 3+ pairs of infrabasals, 4-6 pairs of distal adaxial body scales, 1 pair of inner lateral marginals (and rarely vestiges in some or all of the outer four rows), and the usual 8 operculars. The tentacles are densely packed with small, flat rods transversely disposed in the proximal half but becoming more or less longitudinal distally, and not extending into the pinnules.

The basal and buccal body scale pairs are always open adaxially and are not fused along the abaxial suture. The basal sclerite unit (Pl. 3, fig. 10) bears a pair of pointed, marginal processes (one spine on each scale) which may occasionally be more or less reduced. The oral margin of the buccal unit is broadly expanded as a pair of rounded or somewhat pointed lobes (Pl. 3, fig. 9); rarely, the lobes are subdivided to give the buccal margin a distinctly 4-dentate outline (Pl. 2, fig. 1). The scales of both body pairs overlap where they meet abaxially, and their sutural margins, especially the concealed one, are deeply laciniated. Both basal and buccal scales are sculptured externally with low, simple, rounded granules (Pl. 2, fig. 8), particularly on the abaxial tracts; internally, the sculpture consists of rather regular, small but complicated warts (Pl. 2, fig. 7). The free margins of the buccals have a distinct border virtually free of sculpture.

Normally there are three pairs of abaxial, and several adaxial, infrabasal scales between the basal body scale pair and the rind scales, and although the actual number of scales is often greater (perhaps due to breakage), two or three transverse rows are usually distinct. When intact, the abaxial infrabasals are transversely oval scales curved to fit the zooid base.

The eight opercular scales are situated between the eight tentacle

bases and together form a tall, protruding operculum. They overlap in the abaxial to adaxial direction on both sides of the zooid, beginning with the major abaxial opercular, which overlaps both of its neighbors, and ending with the minor adaxial, which itself is more or less overlapped by both of its neighbors. The major abaxial and minor adaxial operculars are almost symmetrical: The abaxial is a tall pentagon (Pl. 3, fig. 1), the adaxial a narrow triangle (Pl. 3, fig. 4). The intermediate operculars (Pl. 3, figs. 2, 3) are slanted toward the adaxial side of the zooid. The inner keel and corresponding outer trough are very well developed, especially on the larger scales (Pl. 2, fig. 6). A major abaxial opercular may measure about 1.3 mm. in height, a minor adaxial about 0.75 mm.

Below the opercular scales of the adaxial rows lie four to six pairs of adaxial body sclerites. They are transversely oval or rounded scales decreasing in size toward the zooid base. Except for the marginal and submarginal pairs, these may be distributed in irregular order. Below these scales there is a naked area followed by a region filled with small scales extended from the infrabasals and from the rind.

There is a large, transversely oval, inner lateral marginal scale below the opercular of both inner lateral rows (Pl. 3, fig. 5); rarely there are rudimentary marginal scales in the outer lateral and abaxial rows also.

The rind scales, in a densely packed cortical layer, overlap one another by their edges. The scales of the twig rind are rounded or irregular scales 0.5-0.9 mm in diameter, sculptured with radiating ridges of fused warts (P. 3, fig. 11). Toward the base the predominant sclerites are radiately sculptured granules of much smaller size (0.05-0.2 mm.) (Pl. 3, fig. 12).

Holotype.—U. S. N. M. No. 49978. Southeast of Agattu Island, Aleutian Islands: 52° 14' 30" North, 174° 13' East, 482 fathoms, fine grey sand and pebbles; bottom temperature 38.6° F. ("Albatross" Station D 4781.)

Remarks.—In exposed parts of the colony, the zooid scales are usually much broken and the marginal ornamentation of the large body scales is suppressed. The scale fragments remain in place and obviously continue growing to form apparently perfect scales. Zooids in this condition bear a strong but abnormal resemblance to those of *Primnoa*.

It is entirely fitting that this species should bear the name of Mr. K. Kinoshita, Japanese zoophytologist who devoted much of his research on the Gorgonacea to the family Primnoidae.

Arthrogorgia otsukai sp. nov.

Pl. 2, figs. 9-12; Pl. 3, figs. 13-27.

Description.—The colony is moderately large and dichotomously branched in one plane. The dichotomy is typically irregular, some branches forming long end twigs as in the preceding species. The short end twigs are commonly about 4 cm. long, and the long ones as much as 15 cm. The axis is longitudinally striated, round, 1.5 mm. in diameter at the lowest part preserved, dark brown with slight metallic luster in the older parts and light brown with golden iridescence in the younger. The coenenchyma surrounding the axis is pierced by several large longitudinal canals, the exact number of which is indeterminable. The zooids,

which face downward, usually occur in whorls of six (Pl. 2, fig. 11). In 3 cm. of axial length there are 11-13 rather openly spaced whorls.

The zooids (Pl. 2, fig. 12) range in height from 2.5 to 2.75 mm., measured parallel with the branch axis. The zooidal spiculation consists of 2 pairs of large body scales, 2+ pairs of infrabasals, 4-6 pairs of distal adaxial body scales, and marginal scales at least in the inner lateral and adaxial rows and often in all. The tentacles contain numerous small, flat rods which apparently do not project into the pinnules.

Both basal and buccal body scale pairs are open adaxially and are not fused together abaxially. The opposing edges along the abaxial suture are thick and bear denticles which hold the scales together much more securely than is the case in *A. kinoshitai*. The basal pair (Pl. 3, fig. 21) carries two short, rounded, distal lobes which are scarcely noticeable in the intact zooids. The oral margin of the buccal unit projects little if at all, and is not armed with spines or processes (Pl. 3, fig. 19). The inner surfaces of the body spicules are sculptured with minute, closely set, complicated warts, whereas the outer surfaces have larger, more sparsely distributed simple granules.

There are ordinarily two, rarely three, pairs of large, curved, abaxial

EXPLANATIONS OF FIGURES

Plate 2

Figs. 1-8: *Arthrogorgia kinoshitai* sp. nov.

1, Two zooid whorls; 2, 3, Two zooids from side; 4, View of zooid showing operculum; 5, Distal part of zooid from adaxial side; 6, Side view of outer lateral opercular scale; 7, Interior sculpture of body scale; 8, Exterior sculpture of body scale, oblique view.

Figs. 9-12: *Arthrogorgia otsukai* sp. nov.

9, Side view of abaxial opercular scale; 10, Distal part of zooid from adaxial side; 11, Two zooid whorls; 12, Zooid from the side.

Magnifications. Figs. 1-4, 11, 12: 9.5x; 5: 12x; 6, 9: 28x; 7, 8: 155x; 10: 18x.

Plate 3

Figs. 1-12: *Arthrogorgia kinoshitai* sp. nov.

1, Abaxial; 2, Outer-lateral; 3, Inner-lateral; 4, Adaxial opercular scales; 5, Inner lateral; 6, Adaxial marginal scales; 7, Abaxial; 8, Adaxial opercular scales from another zooid; 9, Buccal; 10, Basal body scale pairs; 11, Scale of twig rind; 12, Sclerites of trunk rind.

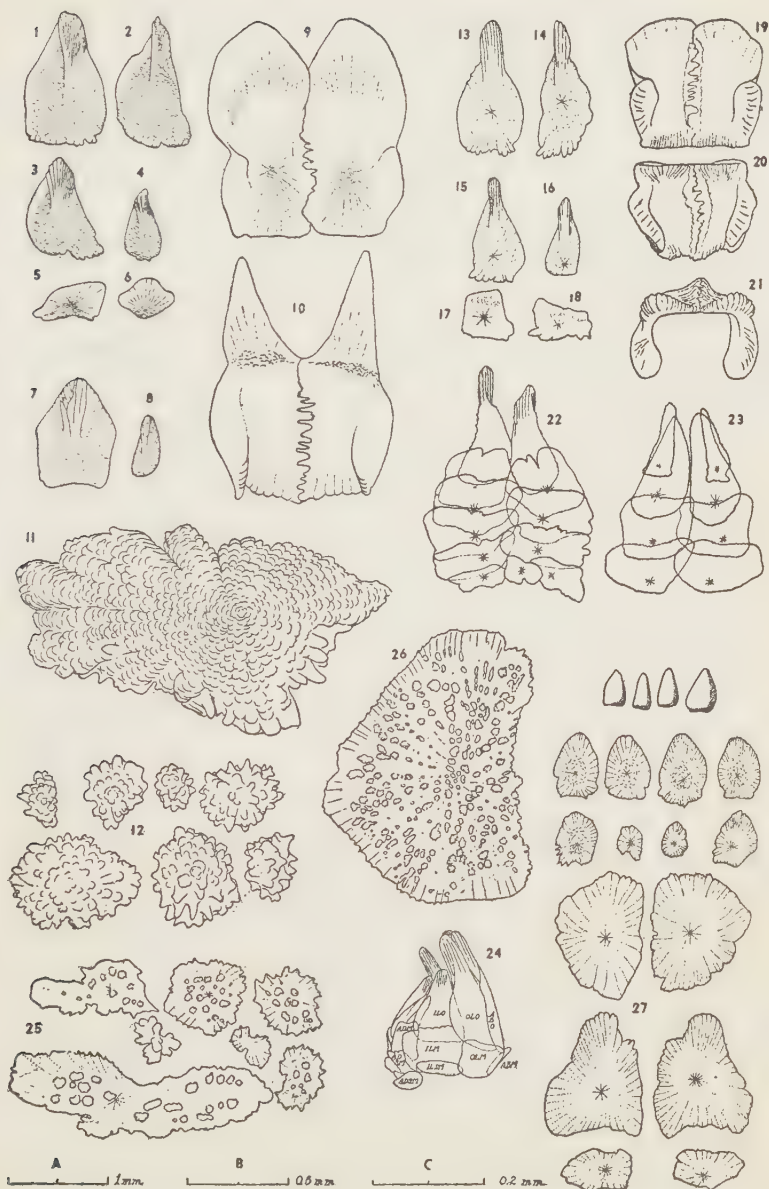
Fig. 13-27: *Arthrogorgia otsukai* sp. nov.

13, Abaxial; 14, Outer-lateral; 15, Inner-lateral; 16, Adaxial operculars; 17, Outer-lateral; 18, Adaxial marginal scales; 19, Buccal; 20, Basal body scale pairs; 21, Basal pair from front; 22, Adaxial body scales, from outside; 23, Adaxial body scales, from inside, showing accessory operculars; 24, Side view of operculum and marginal scales—AD=adaxial; IL=inner-lateral; OL=outer-lateral; AB=abaxial; O=opercular scale; M=marginal scale; SM=submarginal scale; 25, Sclerites of trunk rind; 26, Scale of twig rind; 27, Spicules of very young zooid. Top to bottom: Four of the "inner" operculars; all 8 operculars; buccal pair; basal pair; two of the infrabasal scales.

Magnifications:

Scale A: Figures 1-10; 13-21; 24. Scale B: Figures 22, 23, 27. Scale C: Figures 11, 12; 25, 26.





infrabasal scales surrounding the zooid base, and usually several smaller scales in the lateral and adaxial basal area (Pl. 2, fig. 12).

The operculum protrudes prominently from the buccal pair and consists of eight narrow, roughly triangular scales (Pl. 3, figs. 13-16) situated between the tentacle bases. The edges of the major abaxial overlap the neighboring scales on each side, which in turn overlap one another toward the adaxial side. The small, adaxial operculars lie side by side and are somewhat overlapped by the scales of the inner lateral rows. The opercular keel consists of an aculeate rod running from nucleus to apex of the scale, and is best developed in the larger sclerites. The major abaxial opercular measures about 1.3 mm. in height, and the small adaxial about 0.75 mm. There is sometimes present a pair of small accessory adaxial operculars (0.4-0.5 mm. tall) situated above the attachment of the principal adaxial opercular scales. Such accessory scales may also occur in the inner lateral rows but are most frequently seen in the adaxial rows (Pl. 3, fig. 23).

In the adaxial rows there are 4-6 pairs of distal body scales: the two marginals (adaxial buccals) are squarish, with the distal margin sometimes two- or three-lobed. The submarginals are all more or less transversely oval, and decrease in size toward the zooid base (Pl. 3, fig. 22).

Marginal scales are present usually in all abaxial and lateral rows, always in the inner laterals, where there is a large scale often followed by one or more small submarginal scales (Pl. 3, fig. 24).

In one very young zooid dissected there was within the functional operculum a circle of eight small, thick, triangular sclerites. No marginals were discernible in the lateral and abaxial rows (Pl. 3, fig. 27).

The rind scales tend to be larger in the upper parts of the colony. On the twigs, they are mostly thin scales with serrate edges, measuring about 0.5 mm. in diameter. On the larger branches, there are scales equally large, but in addition a great many, much smaller, rounded scales with deeply toothed edges, and irregular forms (Pl. 3, fig. 25). There are occasional thick plates of large size, observed examples measuring 1.0-1.3 mm. in length. All are sculptured with small but complicated warts which show little tendency to form radiating ridges. The large plates may have a number of smooth marginal spines.

Holotype.—U. S. N. M. No. 49979. Between Bowers Bank, Bering Sea, and the codfish banks off the mouth of the Aangan River, Kamchatka. (U. S. F. C. steamer "Albatross.")

Remarks.—*Arthrogorgia otsukai* is of particular interest because it retains more of the "normal" primnoid spiculation than does any calyptrophorine described heretofore. Since well-formed marginal scales are frequently present in all eight longitudinal scale rows, this species comes closer to the Primnoinae than any other member of the Calyptrophorinae. The presence of marginal scales in all longitudinal rows requires that the large buccal body sclerites belong to the third (if not the fourth) transverse row. The persistence of "inner" opercular scales in the adaxial (or inner lateral) rows suggests not only that the present opercular scales are actually circumoperculars, but also that the process of elimination of the distalmost transverse scale row may have commenced on the abaxial side. The assumption of opercular function by the marginal (circumopercular) scales is taking place elsewhere in the

family, namely in both *Thouarella* and *Primoella*, where the opercular scales are reduced in size on the adaxial side.

Arthrogorgia kinoshitai represents a condition intermediate between *A. ijimai* (marginals never in any but the adaxial rows) and *A. otsukai* (marginals always present in the adaxial and inner lateral, often also in outer lateral and abaxial rows). These connect the Primnoidae with the highly modified Calyptrophoras and may justify the older grouping of the calyptrophorine genera with the Primnoidae.

It is a pleasure to name this species in honor of Mr. Hirohiko Otsuka, whose careful translations of Kinoshita's articles in the Japanese language have put otherwise unavailable information at my disposal in the preparation of this paper.

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PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON

A NOTE ON THE SPECIES *MUSCICAPA WESTERMANNI*

BY S. DILLON RIPLEY

I have recently examined 86 female specimens of the Little Pied Flycatcher, formerly called *M. melanoleuca*, which as Deignan has pointed out (Proc. Biol. Soc. Wash., 60, 1947, pp. 165-66) must now be called *Muscicapa westermanni*. My original interest lay in examining the type of *Muscicapa westermanni apo* (Hachisuka) from Mount Apo, Mindanao, which is in my collection. A close comparison of this single specimen with material from the rest of the Philippine Islands and Malaya, shows that while the Mindanao bird does in fact differ from those of Luzon or Negros, it is inseparable from Malayan birds, and so *apo* must be considered a synonym of typical *westermanni*.

This examination has prompted me to borrow material from the British Museum, the American Museum of Natural History, the Chicago Museum, and the U. S. National Museum, and I am most grateful to the authorities of these institutions for the loan of specimens. In the following discussion, all colors have been compared with Ridgway (*A Nomenclature of Colors*, 1886).

As Mayr points out in the latest discussion of this flycatcher (Bull. Am. Mus. Nat. Hist., 83, Art. 2, 1944, pp. 161-62), this is a markedly heterogynic species, in which the black and white plumage of the male seems to vary not at all. Nor does there seem to be any significant size difference within the species. The sole variation among the populations throughout the species range is in the color of the females, the tone and color of the feathers of the head and back, and the color of the rump, upper tail coverts, and basal edges of the rectrices. Comparing these differences then, I would list the following populations, from west to east throughout the range of this species.

Muscicapa westermanni collini Rothschild

Range.—Himalayas from Kumaon east through Nepal (type locality) and Sikkim. In winter migrant specimens (named *pusilla* by Blyth, 1849) have been taken in central India, now Madhya Pradesh, west Bengal, and in parts of Madras State.

Topotypical females of this race tend to have a hazel-colored shading on the forehead, lores, and around the eye, merging into the brownish-gray of the crown, nape, and upper back, the centers of the feathers of the crown deep olive, almost clove brown. The edgings to the median and lesser wing coverts are pale drab. The rump in this form as well

as the edges of the rectrices are grayish-drab, lacking the bright fuscous or rufescent tones of the more eastern populations. There is a tendency in *collini* to a brownish or hazel suffusion on the feathers of the throat and upper breast, but as in the other forms the abdomen and under tail coverts are white, the basal two-thirds of the feathers dark gray.

Muscicapa westermanni australorientis subsp. nov.

Type.—♀ ad. (Yale Peabody Museum, No. 11912), collected October 14, 1939, by A. David-Beaulieu at Phou Kobo, Laos, French Indochina.

Diagnosis.—Compared to *collini*, this form is less tinged with hazel on the lores and forehead, and lacks any of this coloration on the throat and upper breast. The head and nape are darker, dark mouse-gray in tone, and the back is washed with light tawny-olive. The rump and outer edges of the rectrices vary from russet to mars brown, distinctly brighter and more reddish thus than *collini*.

Compared to *langbianis*, under which name birds from the whole of the Indochinese Subregion were lumped by Mayr (*op. cit.*), this form is lighter, more brownish on the upper surface, the back more washed with tawny-olive, and the rump, upper tail coverts, and edges of the rectrices are dark russet, rather than the pale color, hazel to cinnamon-rufous of the latter form.

Range.—Bhutan, Assam, Burma in the hills, Yunnan, Siam, and Indochina in Laos and Tonkin, wandering irregularly to the adjacent plains in winter.

A female from Margherita in the American Museum collection (No. 605569) and a female from the "Bhutan Duars" in the British Museum collection (Reg. No. 86.4.1,2040) are alike in being strongly olive-brownish on the upper surface, saturated with this color in fact. Another Mandelli specimen from the "Bhutan Duars," however, matches the series of *australorientis* as does a very worn bird collected by Ludlow and Sherriff at Sakden (6000 ft.) in 1934. It may be that there is a markedly saturated population of this species in northeastern Assam and western Bhutan, but lacking more specimens and more definite range data I can only note the existence of these two richly colored atypical specimens.

Muscicapa westermanni langbianis (Kloss)

Range.—Hills of south Annam and southern Laos, Viet Nam or French Indochina.

Compared to *australorientis*, adult females of this form are darker, more uniformly smoky-gray on the upper parts. The lower back and rump is lightly washed with drab, and the upper tail coverts and edges of the rectrices are hazel to cinnamon-rufous. These birds are far lighter, more grayish, and less bluish than the typical form.

Muscicapa westermanni westermanni (Sharpe)

Syn. *Muscicapa westermanni apo* (Hachisuka)

Range.—Malay Peninsula, Sumatra, Borneo (specimens examined from Kinabalu), Celebes, Mindanao, Batjan, and Ceram.

This is the bluest and darkest of the races, females being dark slate-gray above, the rump and upper tail coverts being washed with isa-

belline or cinnamon, and the edges of the rectrices russet. In some specimens the pale brownish or cinnamon wash extends farther up the lower back, but in all specimens examined, the dark bluish or slaty-gray of the upper surface is distinctive. I have not seen any females from south Sumatra which is listed by Chasen (Bull. Raffles Mus., No. 11, 1935, p. 168) as within the range of *hasselti*.

Muscicapa westermanni hasselti Finsch

Range.—Java, Bali, Lombok, Sumbawa, and Flores.

In this form the females are gray strongly washed with olive-brown, especially on the rump. The upper tail coverts are rufous and the edges of the rectrices rich russet. I do not include specimens from southwest Celebes in this range, as listed by Stresemann (Jour. f. Orn., 88, 1940, p. 79) as they appear to me to fit into *westermanni*. A single female from Raketak, Java, in the American Museum Collection, collected in March, seems identical with *westermanni*, and may just possibly be a migrant from Borneo or Sumatra, as the species is partially migratory in continental Asia. I have been unable to identify this locality.

Muscicapa westermanni rabori subsp. nov.

Type.—♀ ad. (U. S. Nat. Mus., No. 192682), collected April 21, 1903, by R. C. McGregor and A. Celestino at Irian, Benguet, Luzon, Philippine Islands.

Diagnosis.—This form is closet to *australorientis* from which it differs by having the upper parts a purer, darker slate gray with much reduced wash of tawny-olive on the back and rump. The upper tail and edges of the rectrices are dark mars brown, slightly richer in tone than in *australorientis*.

Compared to *westermanni* this form is lighter above, lacking the bluish tone of that form, and with more distinctly russet brown upper tail coverts and rectrices.

Range.—Luzon and Negros, Philippine Islands.

I am happy to name this form for Professor D. S. Rabor of Silliman University, Negros Island, the Philippines.

Muscicapa westermanni mayri subsp. nov.

Type.—♀ ad. (Am. Mus. Nat. Hist., No. 346056), collected May 1, 1932, by G. Stein at Ramelan, Timor Island.

Diagnosis.—This form is nearest to *langbianis*, but differs from it by having the upper parts suffused with pale grayish-olive and with paler, olive-fulvous upper tail coverts. The differences when compared with *hasselti* are in the more grayish, less brownish-gray upper parts, and pale rump and upper tail coverts, and from *westermanni* in the much paler upper surface, lacking the bluish-gray tone of that form, and in the more distinctly olive-brownish upper tail coverts.

Range.—Timor and Wetter Islands.

It gives me great pleasure to name this form after Dr. Ernst Mayr.

The differences in back and rump color in the populations of this species seem to vary slightly independently and yet parallel each other. It is not an obvious or simple genetic picture from the external evidence.

Nor is there any obvious correlation with trends or rules such as that of Gloger, with the possible exception of the individual atypical specimens from Lakhimpur, Assam, and Bhutan. If the populations are ranged in line the following color clines are evident:

(1) Back color, slate-gray to olive-brown—*westermanni*→*rabori*→*langbianis*→*mayri*→*collini*→*australorientis*→*hasselti*.

(2) Upper tail coverts color, grayish-drab to rufous—*collini*→*westermanni*→*mayri*→*langbianis*→*australorientis*→*rabori*→*hasselti*.

The above diagram illustrates the problem, and at the same time affords a type of key to the populations.

PROCEEDINGS
OF THE
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A NEW SUBSPECIES OF *MICROTUS OECONOMUS*
FROM ALASKA

BY HENRY W. SETZER

In the course of field work sponsored by the Office of Naval Research in northern Alaska, during the summer of 1951 specimens of small mammals were obtained at several points on the Arctic Slope. Among these is a population of *Microtus oeconomus* that is recognizably distinct from other named kinds of the same species.

In the following description, capitalized color terms are from Ridgway (Color Standards and Color Nomenclature, 1912); all measurements are in millimeters.

This new vole is named for Dr. Raymond M. Gilmore. It may be called:

Microtus oeconomus gilmorei subsp. n.

Type.—Male, adult, skin and skull, United States National Museum No. 293109; Point Lay, (163° 04' W Long. and 69° 46' N Lat.), Alaska; obtained 4 July 1951, by H. W. Setzer, original No. 2396.

Range.—Arctic Slope of Alaska from Point Lay on the west, at least to Umiat on the east and from the Meade River on the north at least to the crest of the Brooks Range on the south.

Specimens examined.—54, all from Alaska: Point Lay, 27; Utukok River, 200 miles SW Point Barrow, 5; Mouth of Chandler River, 1; Anaktuvuk Pass, 16; Umiat, 2; Killik River, 3.

Diagnosis.—Entire upper parts between Snuff Brown and Bister with a moderate admixture of black hairs; color of upper parts shading into the grayish white color of the belly low on the sides; belly but lightly washed with buff; dorsal surfaces of hands and feet with a thin brownish line; tail with a blackish brown dorsal stripe, remainder buffy and with a small penicillate tip; soles and palms naked; all hairs plumbeous at base. Skull robust; zygomatic arches robust and rather angular anteriorly; rostrum rather broad; nasals quite flat and flaring anteriorly; posterior portion of skull broad and rather flat; auditory bullae well inflated ventrally; maxillary teeth heavy.

Comparisons.—*Microtus oeconomus gilmorei* differs from *Microtus oeconomus macfarlani*, as known from the Anderson River, Northwest Territories, Canada, as follows: Color paler and more yellowish; auditory bullae sub-acute instead of rounded posteriorly and acute instead of sub-acute anteriorly, more inflated ventrally, thus presenting the appearance of a longer, narrower bulla; zygomatic arches flaring anteriorly as opposed to nearly parallel; upper incisors more recurved; maxillary teeth heavier; skull averages larger.

From *Microtus oeconomus operarius*, as known from St. Michael,

Alaska, *M. o. gilmorei* differs as follows: Color paler, more yellowish; tail somewhat shorter; auditory bullae larger and inflated instead of small and rather flattened, ventrally; longer heavier maxillary tooth-row; nasals wider anteriorly; interparietal generally narrower in width; skull larger in all measurements taken in animals of comparable age and sex.

Measurements.—Averages and extremes of four males and six females, all adult, from the type locality, are respectively: Total length 171.3 (161.0-181.0), 164.8 (159.0-170.0); length of tail 39.7 (37.0-45.0), 38.8 (35.0-42.0); length of hind foot 19.8 (18.0-21.0), 18.8 (17.0-20.0); length of ear from notch 13.3 (13.0-14.0), 13.0 (11.0-14.0); condylobasal length 27.8 (27.5-28.4), 26.8 (26.4-27.5); palatal length 15.1 (14.8-15.6), 14.6 (14.3-15.2); greatest zygomatic width 15.3 (14.6-15.9), 14.4 (13.8-14.9); least interorbital width 2.8 (2.7-2.8), 2.9 (2.7-3.1); length of nasals 6.95 (6.7-7.5), 6.5 (6.2-6.8); width of rostrum immediately anterior to zygomatic processes of maxillae 2.5 (2.4-2.6), 2.3 (2.0-2.5); greatest width of braincase 11.6 (11.2-11.8), 11.4 (10.6-11.9); alveolar length of maxillary toothrow 5.6 (5.5-5.8), 5.5 (5.2-5.7).

Remarks.—As is typical of the species *Microtus oeconomus* in North America, all specimens were taken in extremely wet tundra areas. The most numerous population was found at sea level at Point Lay but other specimens were obtained at an elevation of 2000 feet near Meat Mountain on the Utukok River and at a somewhat lower altitude at the mouth of the Chandler River.

Intergradation is demonstrated with *Microtus oeconomus macfarlani* in specimens obtained at and near Anaktuvuk Pass. This is evidenced by an intermediacy in the shape of the auditory bullae and length and robustness of the maxillary toothrow.

It is probable that the name *Microtus oeconomus endoeccus* Osgood is valid. This assumption is based on the examination and comparison of specimens from the Yukon drainage area which represent the subspecies *M. o. endoeccus*, and specimens from the Mackenzie area and the Anderson River country of Canada which represent the subspecies *M. o. macfarlani*. Certain characters of the tooththrows, the auditory bullae and the zygomatic arches appear to separate the two populations, but until additional material, particularly that exhibiting a wider range of age groups, is available, it seems best to preserve the current nomenclatorial status of *M. o. endoeccus* as a synonym of *M. o. macfarlani*.

PROCEEDINGS
OF THE
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A NEW EURYTHRIPS FROM VIRGINIA

(Thysanoptera, Phlaeothripidae)

BY J. DOUGLAS HOOD

The new species described below has been known to the writer for more than ten years, but its description has been postponed in the hope that the long-winged form could first be discovered. However, in the course of revising his manuscript key to the known species, it seemed desirable to incorporate it because of its distinctness, and to give it a name.

Eurythrips virginianus sp. nov.

Female, forma brachyptera.—Length about 1.6 mm. (fully distended, 1.9 mm.). Color yellow, with abdomen shaded with brown basally in at least segments II and III, and again apically in the last few segments, the tube always brown but paler at base and apex, the intermediate abdominal segments often bright yellow but occasionally (apparently in older individuals) shaded with brown laterally, the pterothorax more or less brownish along sides; internal pigmentation carmine-red; legs wholly pale yellow; antennae light brown in segments I, II, and VI-VIII, I yellow basally, II yellow apically, III pale yellow in about basal three-fourths, IV and V yellow in about basal third, gray beyond, VI yellow in pedicel, VII and VIII successively darker; all major setae of head, thorax, and abdomen yellow, the terminal setae somewhat darker, brownish.

Head (Fig. 1) about 1.3 times as long as greatest width across cheeks and a little less than 1.5 times as long as the width across eyes, very slightly produced in front of latter, the length in front of eyes about $37\ \mu$, the lateral length of the produced part (between eyes and antennae) about $9\ \mu$, its greatest width $83\ \mu$, its least width 77 ; frontal costa concave, $16\ \mu$ wide; cheeks swollen at middle, conspicuously and roundly converging to eyes and roundly narrowed to basal collar, usually with a small angulation or tooth behind eyes, polygonally reticulate across base and along sides, more lightly so in ocellar area; postocular setae dilated at tip, about $52\ \mu$ long, 103 apart, and about 13 from nearest facet of eyes; postocellar and interocellar setae minute, other cephalic setae small and pointed; vertex slightly produced, almost overhanging. *Eyes* rounded, moruloid, protruding, coarsely faceted, their length about 0.26 that of head, in holotype measuring $46\ \mu$ in length dorsally, dorsal width 35, dorsal interval 67. *Ocelli* $16-17\ \mu$ in diameter, the median one with its anterior margin on a line with insertion of antennae, the posterior ones about $30\ \mu$ apart and 20 from median ocellus. *Antennae* (Fig. 2) slender, more than twice the length of head, pedicels of the apical segments not flared at base, VIII long, almost fusiform, with narrow pedicel; setae pointed or nearly so, ex-

cepting the two near apex of dorsum of segment III, these distinctly knobbed; sense-cones slender and nearly pointed, III 1 (1), IV 1 (2), V 1 (1+1), VI 1 (1+1), VII 1 dorsal. *Mouth-cone* short, semicircularly rounded at tip, extending about 83 μ beyond posterior dorsal margin of head when the latter is horizontal.

Prothorax normal, median length of pronotum about 0.62 that of head and contained in the trans-coxal width about 2.1 times, its dorsal surface without sculpture excepting for a few very faint striae paralleling lateral margins and several, more distinct ones near posterior margin; epimeron largely or almost wholly fused with pronotum; all major setae arising from slight eminences, with colorless dilated tips, the antero marginals minute, pointed, and 4-6 μ long, the antero-angulars 48, midlaterals 46, epimerals 55, postero-marginals 51, coxals 34 (in holotype). *Pterothorax* somewhat narrower than prothorax, without ventrolateral knobbed setae. *Legs* roughened by sculpture, the femora with heavy, anastomosing cross-lines; fore tarsi with a minute tooth arising near apex of first segment. *Wings* reduced to small pads (about 64 μ long), with either one or two major setae, these dilated at tip and 39-48 μ long.

Abdomen moderately large and heavy, fully 1.5 times as broad as prothorax across coxae; all terga largely but rather faintly polygonally reticulate, the more lateral lines often asperate; terga I-VII without large submedian pores, II without subbasal line, this line on III-VIII without pores; all major setae, excepting III on IX and the terminal ones, similar to postoculars and those on prothorax, dilated at tip, seta I on IX (in holotype) 81 μ , II 87, III 103, the terminal ones 93. *Tube* (segment X, only) not strongly constricted at tip, sides slightly concave beyond the somewhat swollen base, its length two-thirds that of head and about 1.8 times its greatest subbasal width, the latter nearly 2.2 times the apical width.

Measurements of female (holotype), in mm.: Length about 1.60 (fully distended, 1.93); head, total length 0.200, width across eyes 0.137, least width just behind eyes 0.120, greatest width across cheeks 0.153, least width near base (in front of basal collar) 0.134; prothorax, median length of pronotum 0.124, width (inclusive of coxae) 0.263; mesothorax, width across anterior angles 0.246; abdomen, greatest width (at segment IV) 0.407; tube (segment X, only), length 0.133, greatest subbasal width 0.073, width across basal collar 0.075, least apical width 0.034.

Antennal segments	1	2	3	4	5	6	7	8
Length (μ)	44	54	68	60	60	54	45	42
Width (μ)	40	34	30	29	26	24	21	13
Total length of antenna, 0.427 mm.								

Male (brachypterous).—Smaller and more slender than female, and colored like that sex; fore tarsal tooth small, pointed, arising from apex of first segment; glandular area on sternum VIII of abdomen forming a complete narrow transverse band close to anterior margin, its width (longitudinally) 10-14 μ ; seta II on segment IX reduced in size.

Measurements of male (allotype), in mm.: Length about 1.30 (fully distended, 1.55); head, total length 0.183, width across eyes 0.121, least width just behind eyes 0.103, greatest width across cheeks 0.134, least width near base (in front of basal collar) 0.123; width of frontal costa 0.014; greatest width between eyes and antennae 0.072, least width 0.068; eyes, dorsal length 0.042, dorsal width 0.033, dorsal interval



PLATE IV

Eurythrips virginianus sp. nov., ♀, holotype

Fig. 1.—Head and first two antennal segments.

Fig. 2.—Segments V-VIII, right antenna.

(Camera lucida; J. D. H.)

0.056; median ocellus, diameter 0.012; posterior ocelli diameter 0.010, interval 0.020, distance from median ocellus 0.010; postocular setae, length 0.043, interval 0.091, distance from eyes 0.016; mouth cone, length beyond posterior dorsal margin of head 0.064; prothorax, median length of pronotum 0.118, greatest width (inclusive of coxae) 0.245; antero-marginal setae, length 0.007, antero-angulars 0.038, midlaterals 0.040, epimerals 0.048, postero-marginals 0.050, coxals 0.031; pterothorax, width across anterior angles 0.210; wingpads, length 0.061, lengths of setae 0.043 and 0.043, respectively; abdomen, greatest width (at segment IV) 0.296; tube (X, only), length 0.110, greatest subbasal width 0.062, least apical width 0.030; seta I on segment IX 0.076, II 0.036, III 0.107; terminal setae, length 0.088.

Antennal segments	1	2	3	4	5	6	7	8
Length (μ) _____	42	49	60	56	53	48	39	39
Width (μ) _____	35	30	27	26	24	22	20	13
Total length of antenna, 0.386 mm.								

VIRGINIA: New Market, March 16, 1941, Dr. Lincoln C. Pettit, 7 ♀'s and 1 ♂, from dead leaves on ground.

E. virginianus belongs with those reticulated species which have the head nearly free of such reticulation between, and for a short distance behind, the postocular setae. From them it may readily be known by the presence on the third antennal segment of only one sense-cone on the outer surface and of two knobbed dorsal apical setae, as well as by the relatively short postocular and other setae.

PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON

A NEW COTTON RAT (GENUS *SIGMODON*) FROM
MORELOS, MEXICO

BY ROBERT J. RUSSELL

The Texas Cooperative Wildlife Collection of the Agricultural and Mechanical College of Texas contains a small series of adult cotton rats, *Sigmodon hispidus*, from the Mexican State of Morelos. Previously, only immature specimens of this species were known from Morelos and these were referred to *Sigmodon hispidus mascotensis* Allen (see Bailey, Synopsis of the North American Species of *Sigmodon*. Proc. Biol. Soc. Washington, 15:101-116, 1902). Examination of near-topotypes of *Sigmodon h. mascotensis* from northern Jalisco and southern Nayarit, as well as representative specimens of other adjacent subspecies reveals that the cotton rat of Morelos belongs to an heretofore unrecognized subspecies for which I propose the name

Sigmodon hispidus obvelatus new subspecies

Type. Adult female, skin and skull, no. 4921, Texas Cooperative Wildlife Collection, Agricultural and Mechanical College of Texas; 5 miles S Alpuyecá, 3700 feet, Morelos, Mexico; collected by W. T. Smith, August 16, 1949, original no. 38.

Distribution. Known from several localities in eastern and western Morelos; probably occurs in the adjacent arid sections of Guerrero and Puebla. Limits of range unknown.

Diagnosis. Size medium for species (see measurements); tail long; hind foot small. Color: Pale, upper parts near Light Ochraceous-Buff (capitalized color terms after Ridgeway, Color Standards and Color Nomenclature, Washington, D. C., 1912) washed with black; under parts creamy-white, almost obscuring the Plumbeous bases of the ventral hairs; creamy-white extending over underside of legs; hind foot whitish above; front foot buffy above; nose yellowish. Skull: Medium in size, narrow, shallow, delicately constructed, and lightly ridged; nasals relatively long; auditory bullae small; interpterygoid fossa wide anteriorly and constricted posteriorly; anterior palatine foramina parallel sided, not constricted posteriorly; interparietal convex posteriorly; molar teeth actually and relatively small; interorbital constriction relatively wide.

Comparisons. From *S. h. mascotensis*, which I judge to be the most closely related subspecies, *S. h. obvelatus* differs as follows: Body smaller (total length averaging 292 as compared with 325); color slightly paler above and more nearly white below, especially paler facially; hind foot whitish rather than buffy and smaller (length 33 as compared with 38); skull smaller (greatest length averaging 35.6 as compared with 38.1), shallower, especially in orbital region, more delicate in structure; zygomatic breadth less (19.3 as compared with 21.1); auditory bullae actually and relatively smaller; molar teeth actually and relatively smaller;

anterior palatine foramina shorter (7.9 as compared with 8.7); hard palate shorter and narrower.

From *S. h. berlandieri*, which occurs to the north, *S. h. obvelatus* differs as follows: Tail much longer; color of upper parts less pinkish; under parts more heavily washed with white; tail darker above; skull narrower, more delicate in structure, and less heavily ridged; zygomatic breadth less; interpterygoid fossa wider; rostrum narrower; interparietal convex posteriorly rather than straight; interorbital construction relatively broader.

From *S. h. inexoratus*, which occurs to the northwest, *S. h. obvelatus* differs as follows: Body larger (total length averaging 292 as compared with 268); tail longer and less densely haired; color of upper parts paler (not so blackish); skull longer (greatest length 35.6 as compared with 33.3); maxillary arm of zygoma longer and more decurved; interpterygoid fossa wider; anterior palatine foramina parallel-sided, not constricted posteriorly; hard palate shorter.

Close comparison with *S. h. toltecus*, which occurs to the east, is not necessary; however, *S. h. obvelatus* differs as follows: Body larger; tail longer; hind foot longer (33 as compared with 29); color of upper parts paler; under parts more whitish; skull larger and deeper; interpterygoid fossa much wider; molar teeth larger; auditory bullae larger.

Measurements. The type followed by an adult male (in parentheses) from Jonacatepec: Total length, 295 (288); length of tail, 147 (132); length of hind foot, 34 (35); greatest length of skull, 36.0 (35.2); zygomatic breadth, 19.1 (—); length of nasals, 14.5 (13.8); interorbital breadth, 5.5 (5.4); breadth of braincase, 14.0 (14.2); depth of braincase, 14.1 (13.5); length of palatine foramina, 8.1 (7.7); length of hard palate, 6.0 (6.3); length of molar tooth-row, 6.5 (6.6).

Specimens examined. Four, all from Morelos, as follows: 5 mi. S AlpuECA, 2; 6 mi. W Yautepec, 1; 2 km. S Jonacatepec, 1.

Remarks. *S. h. obvelatus* inhabits the arid lowlands of Morelos, which are distinguished by a peculiar arid tropical scrub vegetation and heavy soils. This area is a part of the Rio Balsas drainage, and is bounded on the north by the high transverse volcanic mountains that form a barrier to the distribution of *Sigmodon hispidus*.

S. h. atratus Hall is here regarded as a synonym of *S. h. inexoratus* Elliot. Dr. E. Raymond Hall has compared the two subspecies and informed me that they are identical. He unfortunately overlooked *S. h. inexoratus* when he prepared his description of *S. h. atratus*.

It should be noted that *S. h. mascotensis* is actually larger in size of both body and skull than previously reported. The adult specimens of this subspecies used for comparisons here are larger than those referred to in Bailey's account (*loc. cit.*) of *S. h. mascotensis*. Bailey mentions one "very large" specimen from Querendaro, Michoacan. *S. h. mascotensis* approaches *S. h. major* in size; however, the two subspecies are easily separated by cranial characteristics.

I am indebted to Dr. E. Raymond Hall and Rollin H. Baker, Museum of Natural History, University of Kansas, for the use of specimens under their care, and to Dr. H. E. Anthony and Mr. George G. Goodwin, American Museum of Natural History, for the loan of additional specimens.

PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON

A NEW GEOPHILOID CENTIPED FROM THE LITTORAL OF
SOUTHEAST ALASKA

BY RALPH V. CHAMBERLIN

In a collection of centipeds made by Borys Malkin in 1951 in Alaska are specimens of a new *Brachygeophilus* which were found near the lower tide mark on Kuiu Id. A few other geophiloid forms have been recorded as similarly living between the tide marks and as thus surviving frequent and prolonged submergence under water, most of these belonging to the family Schendylidae whereas the present species pertains to the Geophilidae proper.

Brachygeophilus admarinus n. sp.

Head longer than wide (13:11), widest back of middle. Labrum as a whole concave; median division straight or slightly convex, bearing mostly 5 long, acuminate, basally dark teeth; lateral divisions closely pectinate. First maxillae with palpus and inner process both conically pointed and each having typically 5 setae on its ventral face; syncoxite bearing a lappet on each side. Claw of the second maxillae smooth; coxae broadly united with no trace of a median suture.

Prosternum of prehensors unarmed, and with no sclerotic (chitinous) lines. Claws of prehensors when closed not attaining front margin of the head; claws with a minute tooth or tubercle at base.

Anterior sternites each with posterior margin sclerotized in an edge that fits into a transverse notch on anterior border of the succeeding sternite. No ventral pores were detected.

Last ventral plate broadly trapeziform, the sides strongly converging caudal. Coxal pores mostly 6 on each side. Anal pores present. Anal legs each with a well developed claw. Anal legs of female slender, those of male crassate.

Number of pairs of legs 47 in both sexes.

Length, near 25 mm.

Locality. Redd Bay, Kuiu Id., Southeast Alaska. July 23-25, 1951. Numerous specimens taken under stones near the low tide mark by Borys Malkin.

PROCEEDINGS
OF THE
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CONCERNING SOME MEXICANS VELIIDAE (HEMIPTERA)

BY C. J. DRAKE AND F. C. HOTTES

While collecting aquatic Hemiptera in Mexico during the past summer (1951), the authors netted 6 specimens of a robust water-strider of the genus *Velia* Latreille, which was much more active and behaved differently after capture in the net than its congeners. An examination of the specimens showed that the last two segments of the male venter were singularly developed and greatly modified as described in *Velia annulipes* Champion. Further studies also revealed that the male parameres were not the same as the left paramere of the male type figured by Hungerford in 1929.

On account of the differently shaped parameres and other characters, it seemed advisable to have the Mexican species checked with the types of *V. annulipes* Champion in European museums. The writers are greatly indebted to Dr. R. J. Izzard for notes and an outline drawing of the paramere of the male type from Guatemala in the British Museum. Dr. Max Beier of the Naturhistorisches Museum at Vienna has kindly loaned us the male cotype from Mexico (*ex. collection of Signoret*) as listed beneath the original description. Dr. H. B. Hungerford of the University of Kansas has also kindly given us some data relative to the types of *V. annulipes*, which he secured several years ago while studying the types of American aquatic Hemiptera deposited in European Museums. The results of our findings are discussed below under the species concerned, beginning with the description of the Mexican veliid as new to science.

Velia alvaradana, sp. new

(Fig. a)

Apterous male: Large, robust, subfusiform, dark ferrugineous-fuscous with several small groups of glistening silvery hairs. Antennae dark brown with second segment very widely banded with pale testaceous beyond the base (basal dark part much shorter than band; apical part beyond the band darker and approximately equal to the band in size). Pubescence short, very dense, brown. Body beneath dark fuscous-brown with posterior part of venter and genital segments brown. Wing pads tiny, snow white. Macropterous forms unknown.

Size: Length, 5.60 mm.; width, 1.65 mm.

Head: Width across eyes, 1.10 mm.; interocular space, 0.38 mm. Head densely pubescent with scattered long dark hairs, the hairs denser and lighter along inner margins of eyes. Impressed median line distinct, black, convex between the eyes. Rostrum testaceous, becoming blackish apically. Antennae long, slender, shortly pilose with scattered longer

hairs on distal two segments; segment I moderately swollen, slightly bowed; II much slenderer, thicker than next two; III and IV quite slender, equal in thickness; formula—I, 136; II, 74; III, 80; IV, 68.

Thorax: Pronotum blackish with a large central brown area a little back of narrow collar, with a conspicuous small patch of glistening silvery hairs on each side of pale patch; without humeral elevations, with posterior margin slowly broadly rounded, the median length and width across humeral angles nearly equal (120:128). Rest of dorsal part of thorax almost entirely concealed by pronotum.

Legs: Long, moderately stout, pubescent, clothed beneath with longer pale hairs; femora of about equal thickness. Anterior legs—broadest near base, a very narrow band at apex and another subapical band pale testaceous, beneath beset with many short dark spicules, which are not arranged in definite rows; tibiae with a narrow preapical and a narrow subbasal bands testaceous, beneath with two dense rows of short black teeth (rows placed very closely together); tarsi dark brown, hairy; segment I very short and about half as long as second; III nearly three times as long as second. Middle legs with markings similar to fore legs but with the basal testaceous area of femora much smaller; femora beneath with two rather sparse rows of short blunt black teeth (one row sometimes incomplete); tibiae beyond the middle beneath with a sparse row of seven or eight long dark hairs; tarsi beneath with hairs a little longer than the diameter of segments, formula of segments—I, 8; II, 35; III, 42. Hind legs with color markings similar to intermediate legs; coxae and trochanters denticulate beneath; femora beneath with two rows of larger and stouter black teeth; tibiae denticulate beneath, the black teeth tending to be arranged in two irregular rows, formula of segments—I, 8; II, 35; III, 42. Tarsi of all legs with basal part of third and second segments largely testaceous.

Abdomen: Dorsal surface dark ferrugineous with several patches of silvery hairs on last four segments; connexiva with silvery hairs on outer part of joints between segments; venter with hind margin of penultimate segment broadly produced posteriorly with the median part narrowed and terminating in a large tubercle-like process, which extends posteriorly as far as the hind margin of the ultimate segment. First genital segment beneath very strongly abruptly depressed from near the base to apex so as to leave the apical part of segment much thinner than the basal. Left paramere very broad and modified as in figure 1. Right paramere of similar size and shape.

Apterous female: Broader and much stouter than male, but with color and markings quite similar. Antennal formula same as in male, second segment also broadly banded with testaceous. Last segment of venter not quite twice as long as preceding segment, becoming a little narrower posteriorly. Other characters as in male.

Type (male), *allotype* (female) and 3 *paratypes*, Puebla, Mex., July 20, 1951, taken under thinly overhanging vegetation near the water's edge in a small river. Paratype, one specimen, Alvarado, Mex., collected near the shore among aquatic vegetation in a small stream.

This striking species may be separated at once from *V. annulipes* by the banded second antennal segment and shape of the parameres (fig. a). It was taken in company with *V. pueblana* Drake and *V. brachialis* Stål. When netted, *V. alvaradana* is extremely active and runs about swiftly

trying to escape. It is much more agile and faster than *V. brachialis* Stål. Another species, *V. pueblana*, lives in the same type of habitat and is almost as active in the net as *V. alvaradana*.

Velia verana, sp. new

(Fig. b)

Velia annulipes Champion, Biol. Centr.-Amer., Rhynch., 2:142. 1898 (in part).

The name *V. verana* is here proposed for the second specimen (male, cotype) of *V. annulipes* Champion, bearing the labels "Mex., collection of Signoret," "cotype," "*V. annulipes* Champ." as determined by Champion in the Mus. Vind. Caes. As may be noted in the figure, the left male paramere (b) is very different from the male type of *V. annulipes* (c), and more closely related to *V. alvaradana* (a).

V. verana differs from *V. alvaradana* in its smaller size (5.00 mm. long), uniformly colored second segment of antennae (with a very broad testaceous band in *V. alvaradana*) and shorter antennae. Antennal formula—I, 61; II, 36; III and IV wanting. Winged form and female, unknown. We are indebted to Dr. Max Beier for loaning us this unique specimen in the Naturhistorisches Museum at Vienna. The parameres of this species and *V. alvaradana* were drawn by Mrs. Richard Froeschner.

Velia annulipes Champion

(Fig. c)

Velia annulipes Champion, Biol. Centr.-Amer., Rhynch., 2:149, pl. 9, figs. 8 & 8a. 1898.

Velia annulipes Hungerford, Ann. Ent. Soc. Amer., 32:720, fig. 1. 1929.

The type of this striking species is a male from Guatemala in the British Museum, Champion (1898) illustrated a dorsal view of the type, and Hungerford (1929) figured its left paramere. Dr. R. J. Izzard of the Brit. Mus. has kindly made an outline drawing of the type. The hairs are not shown.

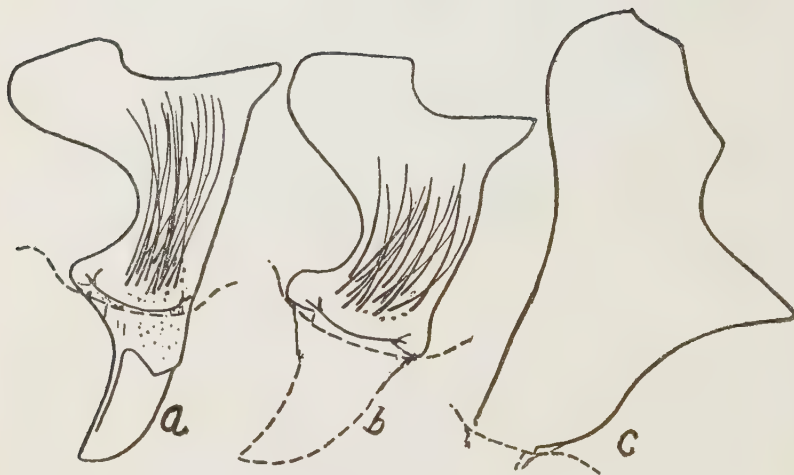


PLATE V

Left Parameres of *Velia*

a. *V. alvaradana* n. sp.

b. *V. verana* n. sp.

c. *V. annulipes* Champion

PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON

NINE NEW BIRDS FROM THE PERIJA MOUNTAINS AND
ELEVEN EXTENSIONS OF RANGES TO VENEZUELA

BY WILLIAM H. PHELPS AND WILLIAM H. PHELPS, JR.

Studies of recent accessions to the collections of Dr. Adolfo Pons, Maracaibo, and the Museo de Historia Natural La Salle, Caracas, show the following subspecies as apparently new. The specimens upon which the extensions of ranges are based are all recent accessions to the Phelps Collection.

A sketch map of the Perijá region with an annotated list of the species known from there at that time is given in "Las Aves de Perijá", by William H. Phelps, Boletín de la Sociedad Venezolana de Ciencias Naturales, No. 56, pp. 265-338, 1943. A bibliography of the birds of the region appears at the end of this paper.

Our thanks go to Dr. Herbert Friedmann of the U. S. National Museum, Mr. W. E. Clyde Todd of the Carnegie Museum and Dr. John T. Zimmer of the American Museum of Natural History for access to their collections.

Specimens listed as examined are in the Phelps Collection, Caracas, unless otherwise specified. Names of colors are capitalized when direct comparison has been made with Ridgway's "Color Standards and Color Nomenclature", 1912. Wing measurements are of the chord.

Premnornis guttuligera (Selater)

Thripophaga guttuligera Selater, Proc. Zool. Soc. London, p. 167, 1864. ("in Nova Granada interiori" = "Bogotá".)

1 ♂, summit of Cerro Pejochaina, 2000 meters, upper Río Negro valley, Sierra de Perijá, Zulía.

This specimen constitutes an extension of range to Venezuela from the western slopes of the eastern Andes of Colombia; not recorded from Santa Marta.

Anabacerthia striaticollis perijana, new subspecies

Type: From Kunana, Río Negro, Sierra de Perijá, Zulía, Venezuela; 1500 meters. No. 599, Museo de Historia Natural La Salle, Caracas. Adult male collected December 30, 1950, by Brother Angel. (Type on deposit, with the Phelps Collection types, at the American Museum of Natural History.)

Diagnosis: Nearest to *A. s. striaticollis* Lafresnaye, of the Mérida region and Colombia, from which it differs by having a shorter wing; the back lighter, more yellowish olive, less rufous brown; under parts also lighter, more yellowish olive, less buffy brown. Differs from *A. s. venezuelana* (Hellmayr), of the Caracas region, by yellower, less grayish

breast and abdomen, and yellowish instead of whitish throat; above yellower, less brownish. From *A. s. anxia* (Bangs), of the Santa Marta region, it differs still more, notwithstanding their relative geographical proximity.

Range: Known from the upper Río Negro region, Sierra de Perijá, at altitude from 1500 to 2300 meters, in the Subtropical Zone.

Description of Type: Top of head Citrine, the feathers with dusky edgings giving a scalloped appearance; back Dresden Brown paler on uropygium; eye-ring, lores and post-orbital stripe buffy; a dusky pre-orbital spot; sides of head mixed buffy and dusky. Chin and throat Naples Yellow, the feathers tipped with olivaceous giving a barred appearance; breast and abdomen paler than Buffy Citrine on the median line and darker on sides, flanks and under tail-coverts; breast and upper abdomen faintly striped with buffy white; axillaries pale buffy. Remiges Fuscous; outer vanes of primaries and secondaries, upper surface of tertials and all upper wing-coverts Dresden Brown uniform with back; bend of wing and outer under wing-coverts olivaceous buffy; inner coverts Antimony Yellow; inner vanes of remiges edged with Warm Buffy, only basally on outer primaries. Tail Amber Brown, paler on under surface.

Bill (in life) "brown"; feet "gray"; iris "brown". Wing, 81 mm.; tail, 67; exposed culmen, 14; culmen, from base, 19; tarsus, 18.

Remarks: Sexes alike. Wing shorter than in *striaticollis*. Range of measurements: five adult males—wing, 80-91 (85.8); tail 67-74 (71.6); culmen from base, 18-19 (18.3); five adult females—wing, 78-82 (79.6); tail, 64-71 (67); culmen from base, 17-18.5 (17.9). Measurements of *striaticollis*: five adult males from Palmira (2) and La Candela (3), Colombia—wing, 92-97 (94.8); tail, 72-76 (74.6); culmen from base, 17-19 (18.2).

Specimens Examined

*A. s. variegaticeps*¹.—GUATEMALA: Finca Sepecuite, 1♂, 1♀; "Guatemala", 1♂. COSTA RICA: Navarette, 1♂, 1♀; Aquinares, 6♂, 1♀; Bonilla, 2♀; Navarro, 1♂, 1♀; Dota, 1♂, 1♀; Cariblanco, 1 (♀). PANAMA: Veragua, 1♂, 1♀; Boquete, 5♂, 1 (♀); Volcán Chiriquí, 1♂, 1♀.

*A. s. anxia*¹.—COLOMBIA: Onaco, Santa Marta, 2♂; Las Nubes, 2♂, 1♀; Valparaíso, 2♂, 5♀, 3 (♀); El Líbano, 1♂, 1♀, 1 (♀).

A. s. striaticollis.—VENEZUELA: Queniquea, 1♀; Guamito, 2♂²; Cubiro, 1♂; Altamira, Barinas, 1♂, 1♀; Guarico, Lara², 2♂, 1♀; Anzoátegui, Lara, 1♂². COLOMBIA¹: Palmira, 2♂, 1♀; San Antonio, Cauca, 2♀; San Agustín, 1♀; La Candela, 3♂; El Roble, 1♀; La Sierra, Cauca, 1♀; Primavera, 1♂; Aguadita, 1♀; "Bogotá", 9. COLOMBIA²: La Cumbre, Valle, 2♂, Bitaco Valley, 5♀; Las Ventanas, 1♂; La Palmita, 3♂, 4♀.

A. s. perijana.—VENEZUELA: Kunana, Perijá, 2♂ (incl. type)³; Cerro Tamuypejocha (=Cerro Pejochaina), 1♂³, 6♂, 5♀, 3 (♀); Cerro Yin-taina, 2♂, 1♀.

A. s. venezuelana.—VENEZUELA: Colonia Chirgua, 1♂; Cumbre de

¹Specimens in American Museum of Natural History, New York.

²Specimens in Carnegie Museum, Pittsburgh.

³Specimens in Museo de Historia Natural La Salle, Caracas.

Valencia¹, 1 ♂, 3 ♀; Hda. Santa Clara, San Joaquín, 1 ♂; Colonia Tovar¹, 1 ♂, 1 (♀); Cerro Golfo Triste, 6 ♂, 5 ♀, 2 (♀); Cerro Negro, Miranda, 1 ♂, 1 ♀.

A. s. temporalis.—ECUADOR¹: Coco, 1 ♂; El Chiral, 1 ♀; Intag, 3 ♂; Alamor, 2 ♀; La Chonte, 4 ♂, 1 ♀; Mindo, 1 ♂, 1 ♀; Río Verde, 1 ♂, 1 ♀.

*A. s. montana*¹.—ECUADOR: Río Sardinas, 1 ♀; Sumaco Abajo, 4 ♂; Guayaba, 1 ♀; Sabanilla, 1 ♂, 1 ♀; Río Oyacachi, 1 ♂. PERU: Chelpe 3 ♂; Chaupe, 3 ♂, 1 ♀; Utcuyacú, 1 ♂, 2 ♀; San Ignacio, 1 ♀; Huarandosa, 1 ♂; Lomo Santo, 1 ♂, 1 ♀, 1 (♀); Santo Domingo, 2 ♀; Río Inambari, 3 ♀; Inca Mine, 1 ♂; Marcapata Valley, 1 (♀). BOLIVIA: Locotal, 1 ♂, 2 ♀, 1 (♀); Yungas, 1 ♂, 1 (♀); Roquefalta, 1 ♂.

Pithys albifrons peruviana Taczanowski

Pithys albifrons, peruviana Taczanowski; Orn. Pérou, 2, p. 73, 1884. (Perú.)

1 (♀), Las Bonitas, upper Río Arauca, Apure.

This specimen extends the range of the subspecies northward, from the eastern base of the eastern Andes in Colombia, to Venezuela in western Apure near the eastern base of the Páramo de Tamá, near the Colombian border.

Grallaria rufula saltuensis Wetmore

Grallaria rufula saltuensis Wetmore. Smiths. Misc. Coll., 106, No. 16, p. 4, Dec. 30, 1946. (South of the south Teta above Airoca, Sierra de Perijá, Depto. Magdalena, Colombia; between 9,500 and 10,000 feet.)

5 ♂, Cerro Tetarí, upper Río Negro, Sierra de Perijá, Zulía; 2900 meters.

These specimens extend the range of the subspecies eastward, from the western slopes of the Sierra de Perijá in Colombia, to the eastern slopes in Venezuela.

Scytalopus femoralis confusus Zimmer

Scytalopus femoralis confusus Zimmer; Am. Mus. Nov., No. 1044; p. 10, Oct. 11, 1939. (Miraflores, east of Palmira, Colombia; 6800 feet.)

1 ♂, 1 ♀, Cerro Pejochaina, upper Río Negro, Sierra de Perijá, Zulía; 1900 meters.

These specimens extend the range of the subspecies northward, from the eastern Andes in Colombia to the Sierra de Perijá in Venezuela.

Machaeropterus regulus zulianus, new subspecies

Type: From La Sabana (Tribu Panapicho), Río Negro, Sierra de Perijá, Zulía, Venezuela; 750 meters. No. 998, Pons Collection, Maracaibo, Venezuela. Adult male collected February 11, 1950, by Adolfo R. Pons. (Type on deposit, with the Phelps Collection types, at the American Museum of Natural History.)

Diagnosis: Nearest to *M. r. striolatus* (Bonaparte) from which it differs by having darker, browner, less reddish, stripes on abdomen, and whiter chin; the back brighter, more yellowish, the crown darker red; the wing shorter. Differs from *M. r. obscuristriatus* Phelps and Gilliard, from the head of Lake Maracaibo, by paler brown abdominal stripes and whiter chin; and upper tail-coverts uniform with back without the orange citrine tinge. Differs from *M. r. antioquia* Chapman by

darker abdominal stripes, whiter chin and the bases of the feathers of pileum white instead of grayish.

Range: Known from the Río Negro region of the Perijá range in the neighborhood of La Sabana at altitudes from 750 to 1300 meters in the lower Subtropical Zone.

Description of Type: Top of head Carmine, the bases of feathers pure white; back and uropygium Pyrite Yellow X Warbler Green; sides of head olivaceous. Chin and throat Olive-Buff X Deep Olive-Buff; breast with Carmine stripes; rest of breast, abdomen and under tail-coverts striped with whitish and Russet, darker on lower abdomen, Tawny on sides and flanks; shanks Cinnamon-Brown. Remiges Benzo Brown, edged outwardly with green, except apically, and inner vanes edged basally with whitish, more extensively so inwardly; greater wing-coverts dusky, others greenish, darker than back; under wing-coverts and axillaries whitish. Tail Benzo Brown, rectrices edged with white on inner edges; shafts brown on upper surface, pure white on lower.

Bill (in life) "brown"; feet "brown"; iris "red". Wing, 51 mm.; tail, 19; exposed culmen, 7; culmen from base, 10.5; tarsus, 14.5.

Remarks: Sexes different in coloration. Wings shorter than in *striolatus*. Range of measurements: six adult males—wing, 51-52 (51.3) mm.; tail, 19-20 (19.6); culmen from base, 10-10.5 (10.6); one adult female—wing, 51; tail, 21; culmen from base, 10.5. Measurements of *striolatus* from Ecuador: six adult males—wing, 53-56 (55); tail, 19-20 (19.5); culmen from base, 10-11 (10.2); six adult females—wing, 49-54 (51); tail, 20-23 (20.6); culmen from base, 10-11 (10.2.)

The female differs from the male in having the upper parts uniformly Yellowish Olive; the carmine breast stripes are lacking; the breast is Isabella Color with fine whitish shaft stripes while the abdomen is paler brownish with wider stripes; under tail-coverts mixed white and yellow; and the white on inner webs of rectrices is lacking.

The juvenile male is similar to the adult female except that the abdominal stripes are similar to, but not as dark, as in the adult male. We list the six "Bogotá" specimens in the American Museum of Natural History as *antioquiae* following de Schauensee⁴ and Hellmayr⁵, but they are intermediate with *striolatus*. Five have white bases to the pileum feathers while the striping of the under parts is intermediate. They may have come from far different localities, one from the other.

Specimens Examined

M. r. striolatus.—VENEZUELA: La Fría, 3 ♂, 1 ♂ juv.; Barinitas, 4 ♂, 1 ♂ juv. ECUADOR: Zamora, 2 ♂, 1 ♀; near Quito, 3 ♂, 1 ♀; E. Ecuador, 1 ♂; San José Abajo, 3 ♀; Río Suno, above Avila, 1 ♀.

M. r. antioquiae.—COLOMBIA: Honda (within 20 miles), 11 ♂; "Bogotá" 6 [♂].

M. r. zulianus.—VENEZUELA: La Sabana (Tribu Panapicho), 2 ♂; La Sabana (Tribu Ayapa), 4 ♂; La Sabana, 4 ♂ juv., 1 ♀.

M. r. obscuroides.—VENEZUELA: El Vigía, 3 ♂ (incl. type), 1 ♀.

M. r. aureopectus.—VENEZUELA: Kabadisocaña, 1 ♂ (type); La Faisca mine, 1 ♀; Sabana, Río Asisa, 4 ♂, 1 ♀.

⁴The Birds of Colombia, Caldasia, 5, No. 24, p. 783, 1950.

⁵Birds of the Americas, etc. Part 6, p. 39, 1929.

⁶Specimens in the Pons Collection, Maracaibo.

Ochthodiaeta fumigata fumigata (Boissonneau)

Tyrannula fumigata Boissonneau, Rev. Zool., 3, p. 71, 1840. (Santa Fé de Bogotá.)

1 ♂, 2 ♀, Cerro Tetarí, upper Río Negro, Sierra de Perijá, Zulia; 2900 meters.

These specimens extend the range of the subspecies from Colombia to the Sierra de Perijá in Venezuela.

Ochthoeca rufi-pectoralis rubicundulus Wetmore

Ochthoeca rufi-pectoralis rubicundulus Wetmore, Smith. Misc. Colls., 106, No. 16, p. 8, Dec. 30, 1946. (Above Airoca, between 9,500 and 10,000 feet south of the south Teta, Sierra de Perijá, Depto. Magdalena, Colombia.)

2 ♂, 2 ♀, 4 (?), Cerro Tetarí, upper Río Negro, Sierra de Perijá, Zulia; 2,900 meters.

These specimens extend the range of the subspecies eastward, from the western slopes of the Sierra de Perijá in Colombia, to the eastern slopes in Venezuela.

Ochthoeca diadema rubellula Wetmore

Ochthoeca diadema rubellula Wetmore, Smith. Misc. Colls., 106, No. 16, p. 7, Dec. 30, 1946. (Above Laguna de Juncos, between 8,000 and 9,000 feet, slopes of Cerro Pintado, Sierra de Perijá, Depto. Magdalena, Colombia.)

1 ♂, 1 ♀, 1 (?), Cerro Tetarí, upper Río Negro, Sierra de Perijá, Zulia; 2,900 meters.

1 ♀ juv., Cerro Pejochaina, Upper Río Negro, Sierra de Perijá, Zulia; 2,300 meters.

These specimens extend the range of the subspecies eastward from the western slopes of the Sierra de Perijá in Colombia, to the eastern slopes in Venezuela.

Tyrannus albogularis Burmeister

Tyrannus albogularis Burmeister, Syst. Übers. Th. Bras., 2, p. 465, 1856. ("Bahia and Pernambuco"; *errore*, Lagoa Santa, Minas Gerais, suggested as type locality by Pinto, Cat. Aves Brasil, 2, p. 134, 1944.)

1 ♂, 1 ♀, Santa Elena de Uairén, Bolívar.

These specimens extend the range of the species more than 500 miles northward from Manaus and south of the Amazon, in Brazil, to south-eastern Bolívar in Venezuela, near the Brazilian border.

Platyrinchus flavigularis vividus, new subspecies

Type: From Jamayaujaina [Cerro], Río Negro, Sierra de Perijá, Zulia, Venezuela; 1650 meters. No. 1002, Pons Collection, Maracaibo, Venezuela. Adult female collected January 18, 1951, by Moisés Nava. (Type on deposit, with the Phelps Collection types, at the American Museum of Natural History.)

Diagnosis: Differs from *P. f. flavigularis* Selater, from the State of Lara in Venezuela and from Colombia, by brighter and deeper yellow chin and abdomen; breast greenish yellow without the brownish wash; back brighter, more yellowish green, less brownish.

Range: Known from the upper Río Negro valley in the Sierra de Perijá in the subtropical zone, at altitudes from 1600 to 2100 meters.

Description of type: Top of head Dresden Brown; a partially concealed large and prominent pure white crown patch, the white feathers with subterminal black bands and tips uniform with crown color; back Citrine X Sulphine Yellow; uropygium less yellowish; lores yellowish; sides of head paler than crown. Chin and throat Wax Yellow; a yellowish olive wash across breasts; sides olivaceous; abdomen and under tail-coverts Citron Yellow. Wings Fuscous; remiges and wing-coverts narrowly edged externally with olivaceous; bend of wing bright yellow; greater under wing coverts grayish, lesser ones and axillaries yellowish white. Tail Fuscous, paler on under surface; rectrices outwardly edged with greenish.

Maxilla (in life) "black"; mandible "rose white"; feet "grayish white"; iris "brown." Wing, 63mm.; tail, 32; exposed culmen, 9; culmen from base, 14; tarsus, 11.5.

Remarks: Sexes alike. Size similar to *flavicularis*. Range of measurements: five adult males—wing, 59-63.5 (61.3); tail, 30-32 (30.8); culmen from base, 13-14 (13.4); five adult females—wing, 58-63 (59.7); tail, 27-32 (30); culmen from base, 13.5-14 (13.6). Measurements of *flavicularis*: one adult female from La Candela, Huila, Colombia—wing, 61; tail, 28; culmen from base, 13.

The male and female which we consider immature have rufous edgings to the greater wing coverts and the under parts are paler yellow; the female has noticeably shorter wings and tail. Besides, the male has a great deal of yellow on the crown patch and the female a lesser amount, while the adults have the patches pure white.

The only published record for Venezuela of *flavicularis* is an adult male from Guarico, Lara, in the Carnegie Museum.⁷

Specimens Examined

P. f. flavicularis.—COLOMBIA¹: Candela, Huila, 1 ♂, 3 ♀; "Bogotá", 1.

P. f. vividus.—VENEZUELA: Kunana, 1 ♂^a; Cerro Jamayaujaina^a, 1 ♂ imm., 1 ♀ (type), 1 ♀ imm.; Cerro Tamuypejocha (=Cerro Pejochaina), 1 ♀^a, 3 ♂, 3 ♀, 6 (?)^a; Cerro Quirinchi, 1 (?)^a; Cerro Jeretaca, 1 ♂^a; Cerro Yin-taina, 1 ♂.

Tolmomyias sulphureus confusus Zimmer

Tolmomyias sulphureus confusus Zimmer, Am. Mus. Nov., No. 1045, p. 8, Oct. 11, 1939. (Villavicencio, eastern Andes, Colombia; 1600 feet.) 1 ♀, Ureña, Táchira.

1 (?), Las Bonitas, upper Río Arauca, Apure.

These specimens extend the range of the subspecies northward from the eastern base of the eastern Andes in Colombia to Venezuela in western Apure and western Táchira, both localities near the Colombian border.

Euscarthmornis granadensis intensus, new subspecies

Type: From Cerro Tamuypejocha, Río Negro, Sierra de Perijá, Zulía, Venezuela; 1975 meters. No. 991, Pons Collection, Maracaibo, Venezuela.

⁷Hellmayr. Birds of the Americas, etc. Part 5, p. 264, 1927.

Adult male collected February 11, 1951, by Moisés Nava. (Type on deposit, with the Phelps Collection types, at the American Museum of Natural History.)

Diagnosis: Differs from all subspecies of *E. granadensis* (Hartlaub) by having a blacker throat, with less brownish tinge, and a purer gray, darker, breast without a brownish cast. Differs additionally from *E. g. pyrrhops* (Cabanis), *E. g. lehmanni* de Schauensee and *E. g. federalis* Phelps and Phelps, Jr. by whitish instead of buffy lores and eye ring.

Range: The upper Río Negro valley, Sierra de Perijá in the Subtropical Zone at altitudes from 1900 to 2900 meters.

Description of type: Top of head, back and uropygium yellower than Warbler green, forehead more dusky; lores and eye ring whitish; ear-coverts dusky greenish. Chin and upper throat, extending through malar region, Dark Mouse Gray; lower throat conspicuously grayish white; breast dark gray with a slight tinge of brownish; abdomen whitish; under tail-coverts tinged with lemon yellow. Wings Benzo Brown; primaries and secondaries finely edged outwardly with greenish gray, tertials heavily so with Pale Green-Yellow; median and lesser wing-coverts heavily edged with greenish uniform with back; bend of wing Picie Yellow; under wing-coverts and axillaries yellowish white. Tail Benzo Brown; rectrices edged externally, except apically, with green uniform with back.

Bill (in life) "black"; feet "brownish gray"; iris "white." Wing, 43 mm.; tail, 43; exposed culmen, 12; culmen from base, 15; tarsus, 16.

Remarks: Sexes alike. Size similar to *E. g. granadensis*. Comparison of measurements: four adult males—wing, 43-43(43); tail, 40-43(41.5); culmen from base, 14-15(14.2); five adult females—wing, 43-45(44.2); tail, 39-40(39.4); culmen from base (4), 14-14(14). Measurements of *E. g. granadensis*: three adult males from Páramo de Tamá—wing, 42-44(43.3); tail, 40-43(41.7); culmen from base, 13-14(13.7); three adult females (one from Páramo de Tamá, two from Colombia¹)—wing, 44-45(44.7); tail, 38-43(40); culmen from base, 13-15(14).

Specimens Examined

E. g. federalis.—VENEZUELA: No León, 1 ♀ (type).

E. g. intensus.—VENEZUELA: Cerro Tamuypejocha (=Cerro Pejochaina) (Zulia, 1 ♂ (type)^a, 2 ♀, 1 ♀^a, 3 (?); Cerro Jurustaco, 1 ♂; Cerro Tetari, 2 ♂, 6 ♀.

E. g. granadensis.—VENEZUELA: Páramo de Tamá (camp), 3 ♂, 1 ♀. COLOMBIA: 10^a.

Phelps and Phelps, Jr., Proc. Biol. Soc. Wash., 63, p. 121, 1950.

E. g. lehmanni.—COLOMBIA: Santa Marta, 1 (?)¹.

*E. g. pyrrhops*³.—ECUADOR: 3. PERU: 10.

Phylloscaries superciliaris griseocapillus, new subspecies

Type: From Cerro Pejochaina, Río Negro, Sierra de Perijá, Zulia, Venezuela; 1900 meters. No. 1098, Pons Collection, Maracaibo, Venezuela. Adult male collected February 16, 1952, by Ramón Urbano. (Type on deposit with the Phelps Collection types at the American Museum of Natural History.)

Diagnosis: Differs from the type of *P. s. palloris* (Griscom), from

^aSpecimens in American Museum of Natural History, New York. For localities see

eastern Panamá, by having a pure gray crown and nape instead of grayish brown; the chestnut on head is darker; back, uropygium and edgings of rectrices is a brighter, more yellowish green; edgings of remiges more yellowish, less grayish green; under parts from chin to vent more purely grayish white without the faint brown tinge on throat and breast and dull yellowish on abdomen; under tail-coverts pale sulphur instead of whitish.

Range: The Subtropical Zone in the upper Río Negro region, Sierra de Perijá, at altitudes from 1650 to 2000 meters.

Description of type: Top of head and nape Castor Gray, feathers of crown and forehead with dusky centers giving a faint striped appearance; back and rump Cource Green; upper tail-coverts whitish, the feathers faintly tipped with pale greenish, making a whitish band of 4 mm. in width; extreme edge of forehead, lores and superciliary stripes Burnt Sienna; base of feathers against nostrils conspicuously white; ear-coverts grayish and rufous; sides of head mixed grayish and dusky. Under parts grayish white, more grayish on sides of breast and flanks; lower flanks and under tail-coverts Sulphur Yellow; axillaries whitish. Wings Fuscous; remiges edged externally, except apically, with greenish gray, more yellowish and prominent on tertials; median and lesser wing coverts lightly edged with green, uniform with back; bend of wing white; under wing-coverts whitish. Tail Benzo Brown, paler on under surface; rectrices, except outer ones, edged, except apically, with Cource Green.

Bill (in life) "black"; feet "blackish gray"; iris "brown." Wing, 61 mm.; tail, 55; exposed culmen, 9; culmen from base, 12.5; tarsus, 17.

Remarks: Males have longer wings and tails. Size similar to *palloris* and *P. s. superciliaris* (Selater and Salvin). Range of measurements: five adult males—wing, 56-61(58.4); tail, 54-55(54.8); culmen from base, 11-13(12.1); three adult females—wing, 50-52(51.1); tail, 48-49(48.3); culmen from base, 11-12(11.7). Measurements of the adult male type of *palloris*: wing, 60 mm.; tail, 57; culmen from base, 12; tarsus, 16. Measurements of *superciliaris* according to Hellmayr⁹: wing, 58; tail, 56; "bill", 9.8; tarsus, 16.

Outside of the Perijá specimens we know of only six others of the species *superciliaris*: two co-type females of the subspecies *superciliaris* in the British Museum from Chitra and Calovevora, Veragua, Panamá, and two from Costa Rica; and of *palloris* two specimens, the type from Tacarcuna, eastern Panamá and a "Bogotá" skin in the Paris Museum. Regarding the species, Griseon¹⁰ says in his original description of *palloris* "One of the rarest and least known of the Tyrant Flycatchers in the world—". It was described as of the genus *Leptotriccus*. Hellmayr⁹ placed it in *Mecocerculus* and de Schauensee¹¹ considers it *Phylloscartes*.

Apparently there has been a confusion as to the type locality of *palloris*. Griseon¹⁰, in his original description, gives the type locality as "Tapalisa, E. Panamá." de Schauensee¹¹ also says "Tapalisa, eastern Panamá." The senior author examined the type specimen in the American Museum of Natural History. The label says "Tacarcuna, E.

⁹Birds of the Americas, 5, p. 400, 1927.

¹⁰Occ. Papers Boston Soc. Nat. Hist., 8, p. 200, 1935.

¹¹The Birds of Colombia. Caldasia, 5, No. 24, p. 852, 1950.

Panamá." Dr. Zimmer, *in litt.*, advises us that the type was collected at 5000 feet elevation and that Tapalisa (or Tapaliza) is some ten or twelve miles to the southwest of Tacarcuna at apparently 300 feet elevation. He says that the difference in latitude and longitude is not of significance but that of elevation might be important. The altitude of Tacarcuna is subtropical while that of Tapalisa is decidedly tropical.

Specimens Examined

*P. s. palloris*¹.—PANAMA: Tacarcuna, eastern Panamá (type), 1 ♂.

*P. s. griseocapillus*².—VENEZUELA: Cerro Jamayaujaina, 1 ♂; Cerro Pejochaina, 1 ♂ (type), 1 ♂, 3 ♀; Cerro Jurustaco, 4 ♂, 2 (♀).

Turdus fuscater cacozelus (Bangs)

Merula gigas cacozela Bangs, Proc. Biol. Soc. Wash., 12, p. 181, 1898. (Macotama, Sierra Nevada de Santa Marta, Colombia.)

3 ♂, 4 ♀, Cerro Tetarí, upper Río Negro, Sierra de Perijá, Zulia; 2900 meters.

These specimens extend the range of the subspecies from the Sierra de Santa Marta in Colombia to the Sierra de Perijá in Venezuela.

Vireo altiloquus bonairensis Phelps and Phelps, Jr.

Vireo altiloquus bonairensis Phelps and Phelps, Jr., Proc. Biol. Soc. Wash., 61, p. 173, Nov. 12, 1948. (Bonaire Island, Dutch West Indies.)

1 ♂, Laguna Arestinga, Margarita Island.

1 (♀), Boca de Río, Margarita Island.

These specimens extend the range of the subspecies from Bonaire to Venezuela.

Diglossa caerulescens ginesi, new subspecies

Type: From Cerro Tamuypejocha, Río Negro, Sierra de Perijá, Zulia, Venezuela; 1975 meters. No. 1609, Museo de Historia Natural La Salle, Caracas, Venezuela. Adult male collected February 13, 1951, by Moisés Nava. (Type on deposit, with the Phelps Collection types, at the American Museum of Natural History.)

Diagnosis: Nearest to *D. c. saturata* (Todd) of the Andes of Colombia and Venezuela, from which it differs by being a brighter, lighter blue. From *D. c. caerulescens* (Sclater) of the Caracas region by being a brighter, less grayish, blue.

Range: Known from the upper Río Negro Valley, Sierra de Perijá, in the Subtropical Zone from 1900 to 2900 meters.

Description of type: Anterior forehead for two centimeters against culmen, preocular and anterior malar regions blackish; rest of forehead Cadet Gray merging into the Dark Green-Blue Gray X Green-Blue Slate of occiput, sides of head and back; uropygium slightly paler. Chin dusky; throat, breast, sides and flanks Deep Green-Blue Gray; under tail-coverts Dark Gull Gray prominently edged with whitish. Wings Fuscous; outer edges of primaries, except outermost, edged with pale Russian Blue; secondaries edged externally with Dark Green-Blue Gray, the tertials extensively so; remiges slightly grayish on edges of inner vanes except apically; upper wing-coverts heavily edged with Dark Green-Blue Gray uniform with back; under wing-coverts and axillaries

grayish. Tail Fuscous-Black; under surface paler, the rectrices, except outermost, edged with bluish uniform with uropygium; shafts of rectrices brown on upper surfaces, prominently white on under.

Bill (in life) "black"; feet "black"; iris "red." Wing, 72 mm.; tail, 56; exposed culmen, 12.5; culmen from base, 17; tarsus, 22.

Remarks: Sexes alike. Size similar to *saturata*. Range of measurements: five adult males—wing, 69-74(71.2) mm.; tail, 53-56(54.4); culmen from base, 16-17(16.4); five adult females—wing, 68-71(69.1); tail, 52-55(53.6); culmen from base, 16-17(16.6). Measurements of *saturata* from the Páramo de Tamá region: five adult males—wing, 67-72(69.4); tail, 52-55(54); culmen from base, 16-17(16.4); five adult females—wing, 66-68(67.4); tail, 50-54(51.4); culmen from base, 16-17(16.6).

An immature *saturata* from Páramo Cendé, Trujillo, differs from the adult by having a uniform bluish dusky head, back and uropygium; the black of head is more dusky; below grayish instead of bluish; and the maxilla is flesh color with brown tip instead of all black.

We take pleasure in naming this bird in honor of Reverendo Hermano Ginés of the Colegio La Salle, Caracas, in recognition of his studies of Venezuelan birds and the stimulating influence he has exerted in interesting the students of his institution in many branches of the natural sciences, especially ornithology.

Specimens Examined

D. c. caerulescens.—VENEZUELA: Hda. Santa Clara, San Joaquín, 1 ♂; Colonia Tovar, 1 ♂, 1 ♂¹, 2 ♀, 1 (?) ; No León, 1 ♂; El Junquito, 4 ♂, 3 ♂¹, 2 ♀; Cerro del Avila, 2 ♀; Galipán¹, 5 ♂, 3 ♀; Silla de Caracas², 2 ♂, 1 ♀.

D. c. saturata.—VENEZUELA: Páramo de Tamá, 1 ♂, 2 ♀, 2 (?) ; Villa Páez, 3 ♂; Las Delicias, 1 ♂, 2 ♀; Páramo Zumbador, 1 ♂, 1 ♀; Queniquea, 1 ♂, 1 ♀; Páramo Aricagua, 1 ♂, 1 (?) ; Páramo San Antonio, 1 ♀; Mérida¹, 2 ♂, 1 ♀; Páramo El Escorial, 1 ♂¹; Páramo La Culata¹, 2 ♂, 2 ♀, 1 (?) ; Valle, 2 ♂¹, 1 (?) ; La Cuchilla, 1 ♀¹; Llano Rucio, 2 ♂, 1 ♀; Páramo Santo Domingo, 1 ♂; Páramo Cendé, 1 ♀ juv. COLOMBIA¹: "Bogotá", 5 (?) ; Fusagasuga, 1 (?) ; Popayán, 2 ♀; Cerro Munchique, 1 ♂; Almaguer, 1 ♀; Novita Trail, 1 ♂; El Eden, 1 ♂; Santa Elena, 1 ♀; Barrio Blanco, 1 ♂; El Piñón, 1 ♀; Las Ventanas, 1 ♂.

D. c. ginesi.—VENEZUELA: Cerro Tamuypejocha (= Pejochaina), 19 ♂, 7 ♂⁶, 3 ♂³, 15 ♀, 3 ♀⁶, 2 ♀³, 14 (?) ; Cerro Tetarí, 3 ♀, 1 (?) ; Cerro Yin-taina, 1 (?) ; Cerro Jurustaco, 1 ♂, 2 ♀.

D. c. intermedia.—PERU: 15¹².

D. c. pallida.—PERU: 9¹².

D. c. mentalis.—PERU: 9¹².

Diglossa cyanea obscura, new subspecies

Type: From Cerro Tamuypejocha, Río Negro, Sierra de Perijá, Zulia, Venezuela; 1875 meters. No. 1049, Pons Collection, Maracaibo. Adult male collected February 11, 1951, by Moisés Nava. (Type on deposit, with the Phelps Collection types, at the American Museum of Natural History.)

¹²Specimens in the American Museum of Natural History. For list of localities, see Zimmer, Am. Mus. Nov., No. 1203, p. 6, Oct. 21, 1942.

Diagnosis: Differs from the other subspecies of *D. c. cyanea* (Lafresnaye) by its darker blue color.

Range: Known from the upper Río Negro valley, Sierra de Perijá, in the Subtropical Zone at altitudes from 1875 to 2900 meters.

Description of type: Crown Forget-me-not Blue, merging into the Dusky Blue of back and uropygium; forehead, lores and sides of head, from supraorbital to malar region, and chin black. Rest of under parts uniform with back; under tail-coverts prominently edged with white. Wings Fuscous-Black; primaries and secondaries, except outermost, finely edged with light blue, and tertials more heavily so, uniform with crown; greater and median upper wing-coverts heavily edged with Dusky Blue; lesser coverts and bend of wing uniform with crown; under wing-coverts Dusky Blue; axillaries more grayish. Tail Fuscous-Black, paler and more brownish on under surface; outer webs of rectrices prominently edged with bluish; shafts of rectrices on upper surface, whitish on lower.

Bill (in life) "black"; feet "black"; iris "red." Wing, 74 mm.; tail, 57; exposed culmen, 12; culmen from base, 18; tarsus, 21.

Remarks: Sexes alike in color; the female has shorter wings and tail. Size similar to *D. c. cyanea*. Range of measurements: two adult males—wing, 71-74(72.5) mm.; tail, 56-57(56.5); culmen from base, 17-18(17.5); five adult females—wing, 64-67.5(66); tail, 50-55(52.6); culmen from base, 16-17(16.6); three adults of undetermined sex—wing, 63-65(64); tail, 51-51(51); culmen from base, 15.5-16(15.8). Measurements of *cyanea* from the region of the Páramo de Tamá: five adult males—wing, 74-75(74.2); tail, 56-59(58); culmen from base, 18-19(18.4); three adult females—wing 69-71(69.7); tail, 53-55(54); culmen from base (2), 17-18(17.5).

Specimens Examined

D. c. obscura.—VENEZUELA: Cerro Tamuypejocha (=Cerro Pejo-chaina), Perijá, 2♂, 1♀, 2♂, 3 (♀); Cerro Tetarí, 2♀.

D. c. cyanea.—VENEZUELA: Páramo de Tamá, 7♂ (2400-3000 m.); Villa Páez, 3♀; Las Delicias, 1 (♀); Páramo Zumbador, 2♂, 2♀, 1 (♀); Boca de Monte, 6♀; 2♀; El Muerto, Páramo Aricagua, 2♂, 2♀, 1 (♀); Quintero, 1 (♀); Páramo San Antonio, 1♂; Valle, 1♂; Tabay, 1♂; Páramo El Escorial, 1♂; Llano Rucio, 1♀; Mesa de Lino, Páramo Santo Domingo, 2♂, 1♀, 1 (♀); Páramo Misisí, 5♂, 2♀; Cendé, Páramo Cendé, 4♂, 2♀; Colonia Tovar, 1♂, 1♂ juv., 1♀, 2 (♀), 1 (♀) juv. VENEZUELA¹: (Mérida, Páramo El Escorial, Nevados, Valle), 2♂, 2♀, 3 (♀); Colonia Tovar, 1♂. COLOMBIA¹³: 34♂, 19♀, 9 (♀). ECUADOR¹³: 17♂, 7♀, 6 (♀).

*D. c. dispar*¹³.—PERU: 10. ECUADOR: 10.

*D. c. melanopis*¹³.—PERU: 34. BOLIVIA: 18.

Anisognathus lacrymosus pallididorsalis, new subspecies

Type: From "Frontera", Río Negro, Sierra de Perijá, Zulia, Venezuela; 2900 meters. No. 1611, Museo de Historia Natural La Salle, Caracas. Adult male collected December 29, 1950, by F. Martin S.

¹³Specimens in the American Museum of Natural History. For localities see Zimmer, American Museum Novitates, No. 1203, p. 7, Oct. 21, 1942.

(Type on deposit, with the Phelps Collection types, at the American Museum of Natural History.)

Diagnosis: Differs from all subspecies of *A. lacrymosus* (Du Bus) by its paler crown and back, more grayish, less bluish. Nearest to *A. l. tamae* (Phelps and Gilliard) from which it differs additionally by lighter blue rump, and forehead and sides of head lighter, more yellowish, less olivaceous. Differs greatly from *A. l. melanops* (Berlepsch) of the Mérida region by lacking the black head and very dark back. From *A. l. melanogenys* (Salvin and Godman), of Santa Marta, it differs greatly by lacking the bright blue crown and dark blue back.

Range: Known from the upper Río Negro valley, Sierra de Perijá, in the Subtropical Zone at altitudes from 1900 to 2900 meters.

Description of type: Forehead Sulphine Yellow merging into the Deep Mouse Gray of occiput, back and uropygium, the feathers of rump and upper tail-covers broadly tipped with Light Violet-Blue $\times$ Phenyl Blue; superciliary region and sides of head Sulphine Yellow; sub-ocular spot and a patch on side of neck Lemon Chrome. Under parts darker than Light Cadmium, merging into the Primuline Yellow of flanks, lower abdomen and under tail-coverts. Wings Fuscous; outer vanes of primaries, except outermost, edged, except apically, with Etain Blue; secondaries and tertials edged with Squill Blue; inner vanes of remiges edged, except apically, with grayish; upper wing coverts broadly edged with blue uniform with rump; under wing-coverts mixed grayish and yellowish white; axillaries pale yellow. Tail Fuscous, under surface paler; rectrices, except outermost, edged externally with Squill Blue; shafts brown on upper surface, prominently white on under surface.

Bill (in life) "black"; feet "black"; iris "brown." Wing, 95 mm.; tail, 72; exposed culmen, 11.5; culmen from base, 15; tarsus, 26.

REMARKS: Sexes alike. Size similar to *tamae*. Range of measurements: six adult males—wing, 88-95(90.3) mm.; tail, 70-78(73.3); culmen from base, 15-17(16); four adult females—wing, 85-89(87); tail, 71-74(72.2); culmen from base, 15-17(16.1). Measurements of *tamae*: three adult males—wing, 89-90.5(89.8); tail, 74-76.5(74.8); culmen from base (2), 16-17(16.5); three adult females—wing, 85-87(86.3); tail, 70-74(72.6); culmen from base, 16-17(16.3).

Specimens Examined

A. l. melanogenys.—COLOMBIA¹: Santa Marta, El Líbano, 4 ♂; San Lorenzo, 5 ♀.

A. l. pallididorsalis.—VENEZUELA: "Frontera," Sierra de Perijá, 2 ♂ (incl. type)⁸; Cerro Tamuypejocha (=Cerro Pejochaina), 5 ♂, 4 ♂⁹, 1 ♀, 3 ♀⁹, 2 (?) ; Cerro Tetarí, 6 ♂, 7 ♀, 4 (?) .

A. l. melanops.—VENEZUELA: Páramo Zumbador, 5 ♂, 1 ♀; Boca de Monte, 4 ♂, 3 ♀; Páramo Aricagua, 8 ♂, 5 ♀, 2 (?) ; Vallecito, 1 ♀; Páramo El Escorial, 2 ♂, 1 ♀; Páramo San Antonio, 1 ♀; Llano Rucio, 8 ♂, 1 ♀; Páramo Santo Domingo, 6 ♂, 4 ♀, 1 (?) ; Páramo Misisí, 4 ♂, 1 ♀; Páramo Cendé, 9 ♂, 3 ♀, 1 (?) ♀; Páramo Jabón, 2 ♂; Cerro Niquitáz, 1 ♀; var. locs.¹⁴, 14 ♂, 2 ♀, 8 (?) .

A. l. tamae.—VENEZUELA: Páramo de Tamá (3000 m.), 2 ♂, 3 ♀.

¹⁴Specimens in the American Museum of Natural History. For localities see Zimmer, Am. Mus. Nov., No. 1262, p. 7, Sept. 8, 1944.

A. l. olivaceiceps.—COLOMBIA: 14¹⁴.

*A. l. palpebrosus*¹⁴.—COLOMBIA: 32. ECUADOR: 32.

*A. l. caerulescens*¹⁴.—ECUADOR: 9. PERU: 20.

A. l. lacrymosus.—PERU: 10¹⁴.

***Chlorospingus ophthalmicus ponsi*, new subspecies**

Type: From Cerro Tamurpejocha, Río Negro, Sierra de Perijá, Zulia, Venezuela; 1975 meters. No. 1030, Pons Collection, Maracaibo. Adult male collected February 15, 1951, by Moisés Nava. (Type on deposit, with the Phelps Collection types, at the American Museum of Natural History.)

Diagnosis: Nearest to *C. o. venezuelanus* Berlepsch of the Mérida region but differs by having a lighter crown, dusky olive instead of dusky brown; throat darker, more buffy, less whitish. From *C. o. eminens* Zimmer differs additionally by darker breast, less yellowish with an ochraceous wash. From *C. o. falconensis* Phelps and Gilliard differs by paler throat, more yellowish, less ochraceous, and lighter crown, more olivaceous, less dusky brown. From *C. o. jacqueti* Hellmayr differs by darker breast, more buffy, less whitish, throat with more prominent speckles and a darker crown.

Range: Known from the upper Río Negro valley, Sierra de Perijá, in the Subtropical Zone from 1900 to 2900 meters.

Description of type: Top and sides of head Light Brownish Olive, the feathers finely edged with dusky giving a faintly scalloped appearance; a white supraorbital area widening post-orbitally into a prominent triangular spot; upper malar region more dusky; back and uropygium nearest to Yellowish Citrine. Chin and throat Pinkish Buff, throat speckled with dusky; lower malar region more brownish buff; breast Aniline Yellow with an olivaceous tint, feathers of abdomen pale grayish with whitish margins giving a faintly streaked appearance. Wings Fuscous; outer primaries with outer vanes narrowly edged with grayish; outer vanes of other primaries edged basally with Pyrite Yellow and apically with grayish; secondaries and tertiaries widely edged externally with Yellowish Citrine; inner vanes of remiges edged basally with whitish; upper wing-coverts broadly edged with Yellowish Citrine; bend of wing and axillaries yellowish white; under wing coverts whitish. Tail Fuscous, paler on under surface; rectrices margined externally with Yellowish Citrine; shafts of rectrices blackish on upper surface, prominently white on under surface.

Bill (in life) "brownish black"; feet "dark gray"; iris "white." Wing, 67 mm.; tail, 58; exposed culmen, 10.5; culmen from base, 13.5; tarsus, 21.5.

REMARKS: Sexes alike in color; the males have longer wings and tails. Size similar to *venezuelanus*. Range of measurements: five adult males—wing, 67-70.5(68.9); tail, 58-61(59.8); culmen from base, 13.5-15(14.3); five adult females—61-62.5(61.6); tail, 52-56(54.6); culmen from base, 14-14.5(14.1). Measurements of *venezuelanus* from the Mérida region: five males—wing, 65-69.5(68); tail, 54-58(56); culmen from base (4), 14-15.5(14.9); five adult females—wing, 61.5-62(61.9); tail, 51-54(52.4); culmen from base, 13-15(13.9).

We take pleasure in dedicating this bird to Dr. Adolfo Pons in Maracaibo in recognition of his contributions to the advancement of

the ornithology in the state of Zulia. His important collection of the birds of the Perijá region is of great value to students of Venezuelan ornithology.

Specimens Examined

- C. o. ophthalmicus*¹.—MEXICO: 10.
*C. o. dwighti*¹.—GUATEMALA: 14.
*C. o. postocularis*¹.—GUATEMALA: 5.
*C. o. honduratus*¹.—HONDURAS: 4.
*C. o. regionalis*¹.—NICARAGUA: 18. COSTA RICA: 33.
*C. o. novicius*¹.—PANAMA: 6.
*C. o. punctulatus*¹.—PANAMA: 35.
*C. o. tacarcunae*¹.—PANAMA: Tacarcuna, 1 ♂. COLOMBIA: Mt. Tacarcuna (east slope)¹⁶, 4 ♂, 2 ♀.
C. o. falconensis.—VENEZUELA: San Luis, 2 ♂, 2 ♀, 1 ♀¹⁸; Curimagua, 1 ♀, 1 ♂¹, 1 (♀).
C. o. jacqueti.—VENEZUELA: Timotes, 1 ♂; Río La Cristalina, 1 ♂; Páramo Misísí, 7 ♂, 8 ♀, 2 (♀); Cendé, 2 ♂, 4 ♀; El Rincón, Cerro Niquitáz, 10 ♂, 5 ♀, 2 (♀); Cerro El Cogollal, 1 ♀; Cerro El Cerrón, 3 ♂, 7 ♀, 2 (♀); Cubiro, 3 ♂, 4 ♀; Colonia Chirgua, 1 ♂, 1 ♀; Hda. Sta. Clara, San Joaquín, 1 ♂; Colonia Tovar, 7 ♂, 4 ♀, 2 (♀); No León, 2 ♀; El Junquito, 10 ♂, 4 ♀, 4 (♀); Cerro El Ávila, 4 ♂, 3 ♀; Hda. Izcaragua, Guarenas, 1 ♂, 1 (♀); Cerro Golfo Triste, 6 ♂, 3 ♀, 5 (♀); Cerro Negro, Miranda, 2 ♂, 2 ♀, 1 (♀); var. locs.¹⁷, 24.
C. o. venezuelanus.—VENEZUELA: Páramo Zumbador, 2 ♂, 6 ♀; Queniquea, 2 ♂; Boca de Monte, 1 ♂, 1 ♀; Seboruco, 2 ♂, 1 ♀; Valle, 4 ♂, 2 ♀; Páramo El Escorial, 1 ♂; Quintero, 1 ♂, 1 ♀; Páramo San Antonio, 1 ♂; Llano Rucio, 1 ♀; Altamira, Barinas, 1 ♀; var. locs.¹⁷, 12.
C. o. ponsi.—VENEZUELA. Cerro Tamuypejocha (=Cerro Pejochaina), 22 ♂, 15 ♂ (incl. type)⁹, 4 ♂³, 24 ♀, 7 ♀⁹, 1 ♀³, 5 (♀); Cerro Tetarí, 1 ♂, 1 ♀; Cerro Jurustaco, 2 ♂, 1 ♀, 1 (♀); Cerro Yin-taina, 2 ♂.
C. o. eminens.—VENEZUELA: Villa Páez, near Páramo de Tamá, 3 ♀, 1 (♀); Las Delicias, idem., 1 ♂, 1 ♀. COLOMBIA: Gramalote, 1 ♀ (type)¹.
C. o. flavo-pectus.—COLOMBIA: 21¹⁷.
C. o. macarenæ.—COLOMBIA: 10¹⁷.
C. o. nigriceps.—COLOMBIA: 12¹⁷.
C. o. phaeocephalus.—ECUADOR: 10¹⁷.
C. o. cinerocephalus.—PERU: 4¹⁷.
C. o. peruvianus.—PERU: 16¹⁷.
C. o. bolivianus.—BOLIVIA: 3¹⁷.
C. o. fulvicularis.—BOLIVIA: 55¹⁷.
*C. o. argentinus*¹⁷—BOLIVIA: 2. ARGENTINA: 5.

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¹⁵According to de Schauensee (Bds. of Colombia, p. 1062, 1951), the east slope of Mt. Tacarcuna is situated in Colombia.

¹⁶Specimens in U. S. National Museum.

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List of Localities

- | | | | |
|----|---------------------------|----|---------------------|
| 21 | Altamira (Barinas) | 16 | Culata, Páramo la |
| 25 | Anzoátegui (Lara) | 26 | Cubiro |
| 10 | Arauca, Río | 28 | Cumbre de Valencia |
| 15 | Aricagua, Páramo | 7 | Curimagua |
| 35 | Arestinga, Laguna | 6 | El Cerrón, Cerro |
| 36 | Asisa, Río | 6 | El Cogollal, Cerro |
| 31 | Avila, Cerro del | 18 | El Escorial, Páramo |
| 2 | Ayapa, Tribu (=La Sabana) | 30 | El Junquito |
| 21 | Barintas | 15 | El Muerto |
| 13 | Boca de Monte | 24 | El Rincón |
| 35 | Boca de Río | 14 | El Vigía |
| 24 | Cendé | 2 | "Frontera" (Zulia) |
| 24 | Cendé, Páramo | 31 | Galipán |
| 27 | Colonia Chirgua | 33 | Golfo Triste, Cerro |
| 30 | Colonia Tovar | 22 | Guamito |

25	Guarico (Lara)		Sabana)
32	Izcaragua, Hacienda	2	Pejochaina, Cerro
24	Jabón, Páramo	3	Perijá, Distrito
2	Jamayaujaina, Cerro	13	Queniquea
2	Jeretaca, Cerro	18	Quintero
2	Jurustaco, Cerro		Quirinchi, Cerro
37	Kabadisocaña	36	Sabana (Río Asisa)
2	Kunana	16	San Antonio, Páramo
23	La Cristalina, Páramo	7	San Luis
20	La Cuchilla	29	Santa Clara, Hacienda
38	La Faisca, Mina	39	Santa Elena de Uairén
11	La Fría	19	Santo Domingo, Páramo
2	La Sabana	12	Seboruco
9	Las Bonitas	31	Silla de Caracas
8	Las Delicias	18	Tabay
17	Llano Rucio	8	Tamá, Páramo de
1	Maracaibo	2	Tamuypejocha, Cerro (= Cerro Pejochaina)
5	Maracaibo, Lago	2	Tetará, Cerro
18	Mérida	20	Timotes
19	Mesa de Lino	11	Ureña
23	Misisí, Páramo de	18	Valle
34	Negro, Cerro (Miranda)	18	Vallecito
4	Negro, Río (Zulia)	8	Villa Páez
19	Nevados	2	Yin-taina, Cerro
24	Niquitáz, Cerro	13	Zumbador, Páramo
30	No León		
2	Panapiche Tribu (= La		

PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON

CRASPEDACUSTA SOWERBII IN MARYLAND

BY PHILIP ALLAN

On July 2, 1944 Dr. William R. Van Dersal called to the writer's attention the presence of fresh-water jellyfish in a channel of the Potomac River. Several specimens were captured and, although no suitable preservative was at hand, they remained in a sufficiently stable condition to permit identification. Dr. Waldo L. Schmitt of the United States National Museum identified the specimens as *Craspedacusta sowerbii*.

The finding of *Craspedacusta* constitutes a new record of animal life for the property of the Washington Biologists' Field Club, and possibly for Maryland. The location is slightly more than a mile above the town of Cabin John, Montgomery County, Maryland, in the channel between the mainland and Plummers Island. At the time that the specimens were taken the channel was connected with the river only at the downstream end. There was little apparent water movement in the channel.

Schmitt (American Naturalist, LXXIII, pp. 83-89, January-February 1939) reports the jelly fish from the District of Columbia and from nearby localities in Virginia, but does not list Maryland among the states in which it has been found.

In correspondence Dr. Schmitt suggested to the writer a report on his observation, hence, it seems probable that this is the first actual reported occurrence in Maryland. Bennett (American Naturalist, LXVI, 287-288, July-August, 1932) cites Schmitt's record from the Potomac River, and says, "the hydroid of *Craspedacusta* has been found in four different states, and the madusa in ten states, the District of Columbia, and the Canal Zone." Only 8 states, however, can be identified in his table. Maryland is not listed. Dexter, Surrarner, and Davis (Ohio Jour. Sci. XLIX, 235-241, Nov. 1949) list Maryland as a place of record. Dr. Dexter (communication April 6, 1950) believes the Schmitt record from Great Falls may have been interpreted as the Maryland record. Whatever the case, *Craspedacusta* seems to occur from time to time in the vicinity of Washington, D. C. particularly in the Potomac and reservoirs filled from it.

*Soil Conservation Service
Fort Worth, Texas*

PROCEEDINGS
OF THE
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FOUR NEW CHORDEUMOID MILLIPEDS FROM THE
UNITED STATES

(Nematophora, Chordeumoidea)

BY NELL B. CAUSEY
Fayetteville, Arkansas

The inclusion of the family Striariidae in the suborder Chordeumoidea in this paper is a departure from the general practice of regarding it as forming the suborder Striaroidea, on an equal footing with the suborders Chordeumoidea and Lysiopetaloida (Cook 1896, 1899). The family's most striking characteristics—the hood-like first tergite, the broad anal tergite, and the greatly depressed keels—are adaptations for close coiling that have appeared independently in other groups of millipeds, for example, in the order Oniscomorpha and in the family Oniscodesmidae of the order Polydesmoidea. These characters are therefore not of an essential nature and their presence in the Striariidae does not warrant the establishment of a rank as high as a suborder. The labral spines, which Cook believed to be of great taxonomic importance also, have been reduced in value to specific characters since the discovery (Loomis 1936) that in at least one species, and possibly another, the spines are absent. Of greater importance in the Striariidae than any of the characters mentioned above, are the presence of six setae on each tergite, the absence of repugnatorial pores, and the posterior gonopods composed of two articles; the first two of these essential characters are found in all families of the Chordeumoidea and the last in several families. Their presence in the Striariidae justifies the position taken here. Any scheme of grouping that separates the Striariidae from the Chordeumoidea will defeat the major purpose of classification, namely, to place together like objects and to separate unlike objects.

The holotypes of the new species of *Striaria* and *Conotyla* are in the collection of the Illinois Natural History Survey, Urbana, Illinois; and those of *Ozarkogona* and *Caseya* are in the United States National Museum. Paratypes are in the author's collection.

Order Nematophora**Suborder Chordeumioidea****Family Striariidae*****Striaria antica*, n. sp.**

Figs. 1-3

Near *S. columbiana* Cook 1899 in the details of the gonopods; distinguished from that species by the anteriorly directed labral spines.

Male holotype.—Color brown; body cylindrical, although the dorsum is somewhat depressed on the first few segments; no setae observed. Head with 4 or 5 ocelli on each side; labrum (Fig. 1) with anterior margin less convex between the medial teeth and the lateral spines than in *columbiana*; spines directed in front of head, not sharply bent mesiad as in *columbiana*.

Crests coarse and well elevated; surface of metazonites other than crests coarsely granular; prozonites very finely and evenly granular. Collum with 10 crests; segments 2 through 29 each with 12 dorsal and lateral crests; anal segment, which is without crests, terminates in three evenly rounded lobes, the medial of which is slightly longer and wider than the lateral two; the sinuses between the lobes are acute. The usual anteriorly projecting crests near the ventral margin of the metazonites begin on segment 4 and continue through 27, becoming smaller caudad.

Pregenital legs typical of the eastern species of the genus. No pits were observed on the caudal surface of the coxae of the second legs; instead there was a small rectangular lobe on the sternum adjacent to the surface of each second coxa. Coxites of third legs as long as the third segments of those legs. First and third segments of legs 4 through 7 moderately swollen ventrad; third and fourth segments of seventh legs more swollen.

In situ the anterior gonopods are parallel, contiguous, and directed slightly caudad. Each one consists of three pieces (Fig. 2), of which one is lateral and two are medial. The lateral piece is simple, quadrate, shield-like, and shorter than the other two. The antero-medial piece is the one figured by Cook as "the apical portion of the copulatory legs;" its apex is divided into about 10-finger-like pieces; the shaft has the usual several horizontal striae. A portion of the apex of the postero-medial piece is finely pubescent and a stout spine is directed laterad from the apex.

The posterior gonopods, the second pair of appendages on the seventh segment, consist of the usual two segments (Fig. 3), with the second one finely pubescent on the ventral surface.

Length 12 mm., *width* 1.1 mm.

Locality.—Turkey Run State Park, Montgomery County, Indiana; 2 males, M. W. Sanderson, Nov. 4, 1945, from ground cover.

Family Conotylidae***Conotyla pectinata*, n. sp.**

Figs. 4, 5

Similar to the sympatric species *C. specus* Loomis 1939, from which it can be distinguished by the larger size, fewer ocelli, pectinate processes on the gonopods, and the specialization of the pregenital legs.

Male holotype.—Color in preservative horn brown. Ocelli 12 on one side, 13 on the other, in a triangular patch. Antennae as in *C. atrolineata* Cook and Collins 1895. Gnathochilarium without promentum. Segments with distinct humeral swellings, but there are no projecting keels. Segmental setae short and inconspicuous. Prozonites granular, metazonites shining, smooth.

First legs unspecialized. Coxae of legs 2, 3, and 4 unspecialized; the remainder of those legs lost from the type specimen. Segment 3 of fifth legs with a pyramidal lobe on the distal margin. Segments 3 and 4 of sixth legs with low, cylindrical lobes on the proximal region, the distal surfaces of the lobes and the coxae finely spinose. Proximal ventral region of segment 3 of seventh legs with a cylindrical lobe. Tenth legs unmodified except for the usual gland opening in the coxae, from which large mucous plugs protrude. Segment 3 of eleventh legs with a pyramidal lobe on the proximal caudal surface; no gland openings observed in the coxae.

In situ the gonopods resemble those of *specus*; the ventral branches are simple, longer than in *specus*, of almost uniform width throughout their length, with the ends slightly expanded and reaching just beyond the coxae of the eleventh legs. The ventral branches are pectinate along their dorsal surfaces (Fig. 4), while the dorsal branches are either very short or they were broken off near the base.

The posterior gonopods (Fig. 5), or ninth legs, are typical of the genus. Each one consists of two enlarged segments, with the basal one lobed and finely spinose mesiad. The sternum is lamellate and pectinate as shown in the figure.

Width 1.3 mm.

Locality.—Smith Park, Mt. Carroll, Carroll County, Illinois; 1 male, H. H. Ross and M. W. Sanderson, Dec. 6, 1945. Several specimens of *C. specus* were in the same collection.

Family Caseyidae

Caseya similis, n. sp.

Figs. 6, 7

Easily distinguished from *C. heteropus* Cook and Collins 1895 by the attenuated apices of the ventral branches of the anterior gonopods and the details of the coxites of the posterior gonopods. Unfortunately, specific comparisons with *C. sequoia* Chamberlin 1941 and *C. dynotypa* Chamberlin 1947, which were described from females and immature males, cannot be made.

Male holotype.—Color in alcohol dark brown, each segment with several light spots. Eyes triangular, ocelli in rows of 6, 6, 5, 4, 2. Striations and locations of setae typical of the genus. Legs as described for *heteropus* except that the coxae of the sixth have fewer setae.

Each anterior gonopod appears to be composed of three longitudinal pieces, with the lateral piece surpassing the others and partly enclosing them ventrad and laterad (Fig. 6). *In situ*, ventral view, the mesial margins are parallel and almost contiguous for about two-thirds of their length, while the distal one-third is attenuated and directed caudo-laterad. The apices rest on the coxae of the tenth legs.

The posterior gonopods, or ninth legs, are similar to those of *heteropus*

in the large, globular, sparsely setose terminal segment, but they differ in the details of the coxites. The apex of each coxite is bifid; the lateral branch is a thin lamella and the mesial branch is heavier and beak-like, as shown in figure 7.

Width 1.7 mm.

Locality.—Telachapi Pass, Clear Creek, Kern County, California; 1 male, O. F. Cook, Feb. 15, 1929.

Family Cleidogonidae

Ozarkogona ladymani, n. sp.

Figs. 8, 9

Similar in size, pattern, and coloration to the genotype, *O. glebosa* Causey 1951; distinguished from that species by the simpler lobes on the basal segment of the posterior gonopods and the less attenuated ventral branches of the anterior gonopods.

Male holotype.—Brown above; lateral buff and brown longitudinal bands; buff below; distal half of legs brown. Eyes black, triangular, the ocelli arranged in rows of 1, 7, 6, 5, 4, 2, 1. Tenth and eleventh legs as in *glebosa*.

Each anterior gonopod consists of a dorsal clavate branch, a short, wide lateral piece, and a ventral branch, of which the dorsal margin is very finely serrated (Fig. 8). The ventral branches are separated at their bases, then contiguous at about the middle of their length, then turn obliquely laterad and dorsad; the ends are rounded and flattened vertically.

The posterior gonopods, or ninth legs (Fig. 9), are composed of four segments, of which the first is thickened, elongated, and lobate; the telopodite, which is composed of segments 2 through 4, is moderately reduced. The second segment is characteristically elongated; the third and fourth are shortened, and the terminal claw is short. The lobes on the basal segment, of which there are two on the cephalic surface and one on the medial surface, are in the same relative position as the lobes in *glebosa*, but those on the cephalic surface are smaller and simpler than in the genotype. The third segment is brown, the fourth, second, and distal one-third of the basal segment and the sternal peg are light brown; cream otherwise. A transverse division of the fourth segment is weakly indicated. *In situ* the telopodites are easily visible against the pleurites of the sixth and seventh body segments; the heads of the clavate branches of the anterior gonopods pass between the sternal peg and the medial lobes of the posterior gonopods, and the ends of the ventral branches rest on the caudal surface of the medial lobes.

Width 1.5 mm.

Type locality.—Rector, Clay County, Arkansas; 2 males, 3 females; George H. Ladyman; March 9, 1952.

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Explanation of Figures

Striaria antica, n. sp., male paratype.

Fig. 1. Labrum, dorsal view.

Fig. 2. Right anterior gonopod, lateral view.

Fig. 3. Right posterior gonopod, cephalic view.

Conotyla pectinata, n. sp., male holotype.

Fig. 4. Right anterior gonopod, lateral view.

Fig. 5. Left posterior gonopod, cephalic view.

Caseya similis, n. sp., male holotype.

Fig. 6. Right anterior gonopod, lateral view.

Fig. 7. Right posterior gonopod, medial view.

Ozakogona ladymani, n. sp., male paratype.

Fig. 8. Right anterior gonopod, lateral view.

Fig. 9. Left posterior gonopod, cephalic view.

All figures are drawn to the same scale except figure 2, which is one-half larger.

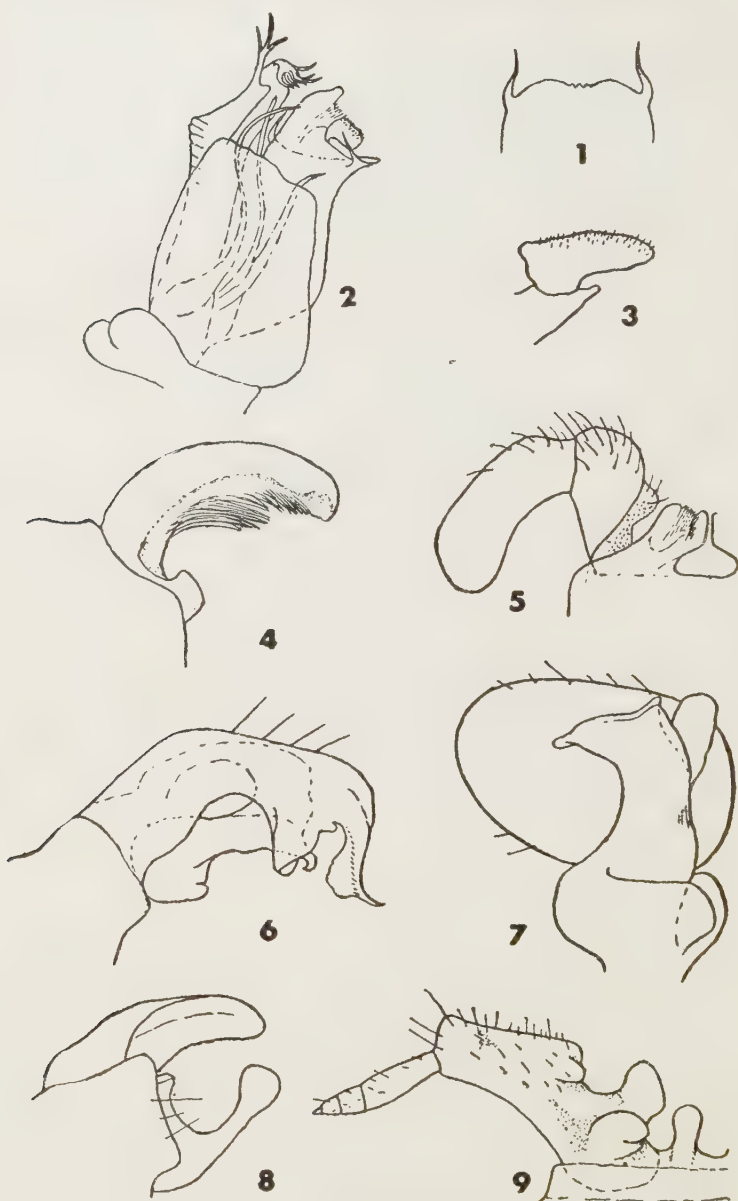


Plate VII

PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON

CHINESE RACES OF *POMATORHINUS ERYTHROGENYS* VIGORS

BY H. G. DEIGNAN*

My friend Arthur de Carle Sowerby has recently brought to my attention that, in 1908 and again in 1909, he collected in the neighborhood of Fushih [Yenan], in northern Shensi, specimens of a ferruginous-cheeked scimitar-babbler very distinct from *Pomatorhinus gravivox* David of southern Shensi. My examination of skins from the areas in question has confirmed his statement, but study of the literature of the species has shown such great discrepancy in the several authors' treatments of these birds, that the new form could be named only subsequently to a thorough revision of all the Chinese populations, which is attempted below. For the loan of valuable material, without which the study could not have been prosecuted, I am greatly indebted to the authorities of the Museum of Comparative Zoölogy (Cambridge), the Peabody Museum of Natural History (New Haven), the American Museum of Natural History (New York), and the Chicago Natural History Museum.

The taxonomy of this scimitar-babbler has been greatly complicated by the fact that the species breaks into three fairly well differentiated groups of races, one ranging from the western Himalayas to the Shan States and northwestern Thailand (*erythrogenys* and allies), another restricted to southeastern China and Formosa (*erythrocnemis* and allies), the third (*gravivox* and allies) occupying the intervening regions. Since *mccllellandi* of Assam and western Burma is an individually variable population, some members of which approach *erythrogenys*, while others are more like *gravivox*, even the earliest trinomialists did not hesitate to treat *gravivox* and *erythrogenys* as conspecific, but eventually Rothschild (Nov. Zool., vol. 33, 1926, p. 262) was to affirm that the two types were absolutely sympatric in central-western and northwestern Yunnan, and Ticehurst (Ibis, 1935, p. 47) that they were probably so also in northeastern Burma. These writers accordingly accepted the two species "*erythrogenys*" and "*mccllellandi*," under the latter name arbitrarily including all Chinese races of *gravivox*-facies, despite the fact that *mccllellandi*, whether geographically or by plumage, is obviously more closely related to *erythrogenys* than to *gravivox*.

Following Rothschild and Ticehurst's views, I have vainly attempted to find a single external character by which a given population of the ferruginous-cheeked scimitar-babbler might be assigned to one or the

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other "species," yet if their claims of sympatry were well founded, some such character must necessarily be discovered. Critical examination of these claims, however, has shown that they are based upon premises of dubious validity.

Rothschild reported that Forrest took two fledglings of "*Pomatorhinus erythrogenis imberbis* Salvad." at Tengyueh and in the Likiang range, at each of which localities he also collected adults of "*Pomatorhinus macclellandi odicus*." Rothschild was clearly unaware that fledglings of members of the *gravivox*-group are plain-breasted and for a time inseparable from those of members of the *erythrogenys*-group, and one of Forrest's skins (Tengyueh) that now lies before me (A.M.N.H. No. 586216) is in fact almost identical with an equieval topotypical specimen of *odicus*. Rothschild's statement that Anderson likewise took "*imberbis*" at Tengyueh is not confirmed by Anderson's own comments on the skin that he in fact misidentified as "*erythrogenys*": "This specimen agrees in every respect with one from Simla, except that the breast is dashed with dark-brown instead of dusky, of the same intensity as in *P. erythrocnemis*, Gould, to which it has wonderful resemblance in many ways; but the bright rusty of the knees and vent are not darker than the rusty on the sides of the abdomen and body generally" (Anatomical and Zoological Researches, comprising the results of the two expeditions to Western Yunnan, 1868 and 1875, p. 634, 1878). The "wonderful resemblance" to *erythrocnemis* of Formosa seems to show that Anderson was dealing with an example of *odicus*, the member of the *gravivox*-group common at Tengyueh.

With reference to eastern Burma, Tiechurst (*loc. cit.*) has observed: "... so near together as Bhamo [lat. 24°15' N., long. 97°14' E.] and Bernardmyo [lat. 23°00' N., long. 96°30' E.] *odicus* and *erythrogenys imberbis* are found, the two bearing little resemblance to each other, and no intergrades being known." It must be noted, however, that Bhamo is in the "distribution area" known as "North-East Burma," while Bernardmyo lies in the one known as "The Northern Shan States," and numerous plastic species are represented in these diverse areas by distinct races (*cf. Garrulax erythrocephalus forresti* and *G. e. woodi*). Sympatry in eastern Burma is, then, an assumption almost certain to be false.

Since all forms of ferruginous-cheeked scimitar-babblers from the western Himalayas to Formosa are apparently allopatric, and no characters of specific value can be found for separation of the several groups, all may be treated as races of *Pomatorhinus erythrogenys* Vigors, 1832.

I find in China ten recognizable subspecies, of which four are here to be named for the first time. Racial distinctions appear mainly in the general coloration of the upper parts, and since immature specimens show a tawny wash, and worn ones become more grayish, my diagnoses have been based wholly upon fresh-plumaged adults (October-January).

1. *Pomatorhinus erythrogenys odicus* Bangs and Phillips

Pomatorhinus macclellandi odicus Bangs and Phillips, Bull. Mus. Comp. Zool., vol. 58, No. 6, Apr. 1914, p. 286 (Mengtsz [lat. 23°23' N., long. 103°27' E.], southeastern Yunnan).

Pomatorhinus erythrogenys minor Delacour and Jabouille, L'Oiseau et

la Revue Française d'Ornithologie, vol. 11, pt. 2, No. 7, July 1930, p. 400 (Pa Kha [lat. $22^{\circ}32'$ N., long. $104^{\circ}18'$ E.], Laokay Province, Tongking).

Diagnosis: General coloration of upper parts olivaceous brown, with a rufescent suffusion; front and supraloral region, auriculars, sides of neck and breast, flanks, and under tail coverts vivid ferruginous.

Range: Southeastern Yunnan; northwestern Tongking; northern Laos; Southern Shan States (Kengtung State); southwestern Yunnan (north to Yunlung at lat. $25^{\circ}53'$ N., long. $99^{\circ}20'$ E.); northeastern Burma (vicinity of Htawgaw at lat. $25^{\circ}57'$ N., long. $98^{\circ}22'$ E.).

2. *Pomatorhinus erythrogeus decarlei*, subsp. nov.

Type: U. S. Nat. Mus. No. 312267, adult male, collected at Nguluko (a settlement at elev. 10,000 ft. in the mountains just north of Likiang), northwestern Yunnan, in January-February 1929, by Joseph F. C. Rock (original number 935).

Diagnosis: Coloration of upper parts similar to that in *odicus*, but with less rufescent suffusion, so that the general tone is darker and grayer; front and supraloral region, auriculars, sides of neck and breast, flanks, and under tail coverts of a slightly deeper and considerably less vivid ferruginous.

Range: Northwestern Yunnan (Likiang range); southeastern Sikang; southwesternmost Szechwan.

3. *Pomatorhinus erythrogeus stoneae*, subsp. nov.

Type: U. S. Nat. Mus. No. 296714, adult male, collected in the mountains near Yangtza [ca. lat. $28^{\circ}15'$ N., long. $98^{\circ}48'$ E.], northwesternmost Yunnan, in November 1923, by Joseph F. C. Rock (original number 1441).

Diagnosis: From *decarlei* separable by having the coloration of the upper parts a decidedly darker rufescent-olivaceous brown, and from *dedekeni* by having these parts a distinctly warmer and more rufescent olivaceous brown. Each of five specimens examined also has the pectoral streaks broader than I have found them in any example seen of any other race.

Range: Mekong valley between lats. ca. $27^{\circ}12'$ N. and ca. $28^{\circ}15'$ N.

Remarks: This form may be found to occur also in northernmost Burma and easternmost Assam, from neither of which areas the species is yet known.

It is named in honor of Mrs. Joan Evelyn Stone, née Sowerby.

4. *Pomatorhinus erythrogeus dedekeni* Oustalet

Pomatorhinus Dedekensi [sic] Oustalet, Annales des Sciences Naturelles, (Zool.) sér. 7, tome 12, "1891," p. 276 ("Tioungou," error; type locality corrected to Tsonghai [lat. $29^{\circ}56'$ N., long. $98^{\circ}40'$ E.], Sikang, by Oustalet, Nouv. Arch. Mus. [Paris], sér. 3, tome 5, 1893, p. 197, footnote 1).

Pomatorhinus Armandi Oustalet, Annales des Sciences Naturelles, (Zool.) sér. 7, tome 12, "1891," p. 277 ("Aio," error; type locality corrected to Kangting [Tatsienlu], Sikang, by Oustalet, Nouv. Arch. Mus. [Paris], sér. 3, tome 5, 1893, p. 199).

Diagnosis: Near to *stoneae*, but with the upper parts a colder olivaceous

ous brown, more nearly free of rufescent suffusion than any other race, and to *decarlei*, but with the upper parts both colder and darker.

Range: Northeastern Sikang (Kangting [Tatsienlu], Leh [*ca.* lat. 29°56' N., long. 98°40' E.], and Sama [lat. 30°35' N., long. 99°07' E.]).

Remarks: Immatures of this dark form, possessing the usual reddish suffusion of the upper parts, are much like adults of *stoneae*.

The subspecies was named in honor of Father Dedenken, a Belgian missionary who accompanied Bonvalot and Prince Henry of Orléans on the expedition which led to its discovery (*see* Bonvalot, *L'Asie Inconnue / À travers le Tibet*, in any edition). Oustalet's erroneous spelling has been followed by all authors until now, but in justice to the namesake it should be corrected to *dedekeni*.

5. *Pomatorhinus erythrogenys gravivox* David

Pomatorhinus gravivox David, *Annales des Sciences Naturelles*, (Zool.) sér. 5, tome 18, 1873, art. 5, p. 2 (southern Shensi).

Diagnosis: General coloration of upper parts nearest that of *odious*, but with slightly less rufescent suffusion; front, supercilia, auriculars, sides of neck and breast, flanks, and under tail coverts a much duller ferruginous (along the flanks strongly suffused with olivaceous brown).

Range: Kansu and Shensi (so far as these provinces lie south of the Chinling Mountains).

Remarks: In this and some of the succeeding races, the supraloral and auricular regions are conjoined by a ferruginous supercilium.

6. *Pomatorhinus erythrogenys sowerbyi*, subsp. nov.

Type: U. S. Nat. Mus. No. 211874, adult male, collected 12 miles south of Fushih [Yenan-fu], northern Shensi, on January 8, 1909, by Arthur de Carle Sowerby.

Diagnosis: From *P. e. gravivox* (southern Shensi), with which it has been heretofore confused, immediately separable by the decidedly paler rufescent-olivaceous brown of the upper parts generally, and by the paler ferruginous of the front and supercilia.

Range: Although known only from the type locality, this form doubtless ranges throughout the loessland between the Ordos (to the North) and the Chinling Mountains (to the South).

Remarks: A second specimen, taken by Sowerby at the type locality on March 31, 1908, is now in the British Museum (Natural History). That the two skins agree in the characters mentioned above is indicated by the critical remarks and a water-color drawing made by the collector in his field diaries, which have been made available for my use. The pallor of *sowerbyi* is what might be expected in the northernmost population of the species, and in one inhabiting a semiarid terrain.

7. *Pomatorhinus erythrogenys cowensae*, subsp. nov.

Type: Amer. Mus. Nat. Hist. No. 204833, adult female, collected at Wanhshien, eastern Szechwan, on January 6, 1923, by members of the Museum's "Third Asiatic Expedition" (original number G 411).

Diagnosis: From *gravivox* and all other precedent races easily distinguishable by having the general coloration of the upper parts (including the rectrices) rufous brown, darker and redder than in any form

yet mentioned; the front, supercilia, auriculars, sides of neck and breast, flanks, and under tail coverts dark cinnamon (along the flanks strongly suffused with olivaceous brown).

Range: Eastern Szechwan, northern Kweichow, and southwestern Hupeh (the Yangtze valley from Wanh sien to Ichang).

Remarks: The characters of this form have been remarked by Ticehurst (Ibis, 1935, p. 47) and by Mayr (Ibis, 1941, p. 67), each of whom, however, assumed that his material represented *gravivox*. The Kansu bird described by Mayr as "less brownish than six birds from eastern Szechwan" was his only specimen of true *gravivox*.

A single skin from Pingwu [Lungan] (in north-central Szechwan just south of the Kansu border) belongs with a population intergradient between *gravivox* and *cowensae*; it might be represented as *gravivox* > *cowensae*.

The new form is named in honor of Mrs. Alice Muriel Sowerby, *née* Cowens.

8. *Pomatorhinus erythrogenys swinhoei* David

Pomatorhinus Swinhoei David, Annales des Sciences Naturelles, (Zool.) sér. 5, tome 19, Nos. 3-6, May 5, 1874, art. 9, p. 5 ("Koatén" [ca. lat. 27°13' N., long. 117°12' E.], Fukien).

Diagnosis: This race is readily separable from all yet treated by having the feathers of the crown rufescent brown with blackish-brown centers; the remaining upper parts red-brown, much brighter on the mantle, where the color is maroon-chestnut; the front and ill-defined supercilia maroon-chestnut; the auriculars between maroon-chestnut and dark cinnamon; the under tail coverts dark cinnamon; the sides of the throat, breast, and abdomen gray (not ferruginous or cinnamon), strongly washed along the flanks with rufescent-olivaceous brown.

Range: Eastern Kiangsi; Fukien; Kwangtung.

Remarks: This and the two following forms have commonly been considered a species distinct from other ferruginous-cheeked scimitar-babblers (usually with the erroneous specific name *swinhoei*, 1874, rather than *erythrocnemis*, 1863!), but I find no reason not to combine them, since *cowensae* shows a first step toward intergradation between *gravivox* and *swinhoei*, and other steps may be expected in hypothetical populations of Kiangsi, Anhwei, and Chekiang. Approach toward *swinhoei* appears in *cowensae* in the general reddening of the plumage and the strengthening of the dark centers of the coronal feathers, so that, viewed from above, only the fact that the mantle of *cowensae* is concolorous with the remaining upper parts serves to distinguish the two.

While the gray under parts of *swinhoei*, washed on the flanks with rufescent-olivaceous brown, are at first glance very different from the white under parts of *cowensae*, washed on the flanks with dark olivaceous-suffused cinnamon, yet the existence of an intermediate population in Anhwei or western Kiangsi may be postulated by the fact that the northernmost example of *swinhoei* before me (from Kuatung, near the point where Fukien, Kiangsi, and Chekiang meet) has the flanks washed with rufescent brown, almost without olivaceous suffusion, while more southern specimens have the flanks olivaceous brown, almost without rufescent suffusion. Moreover, the principal color distinction appearing

on the under parts of *cowensae* and *swinhoei* is precisely the same as that shown by the nearly related Indian races, *ferrugilatus* and *macclerlandi*.

It might be well to point out that David's "Koatén" (sometimes rendered as "Kaotén" or "Kao-tien," and almost the same place as the modern "Ting-chia-p'ing") is apparently *not* the same as La Touche's "Kuatun" (better, "Kuatung"). On the sketch map that accompanies La Touche's Tandbook of the Birds of Eastern China, "Kuatun" is plainly marked; "Koatén" is not shown, but lies about nine miles west of "Shaowu-fu," which does appear. Since my specimen from Kuatung differs in flank coloration from birds of Nanping [Yenping] and southward (which agree with David's original description of "Koatén" birds), it is important that the two localities be not confused.

9. *Pomatorhinus erythrogenys abbreviatus* Stresemann

Pomatorhinus swinhoei abbreviatus Stresemann, Journ. für Orn., jahrg. 77, hft. 2, Apr. 29, 1929, p. 333 (Yao-shan, Kwangsi).

Diagnosis: According to the describer, this race, founded upon a single female, compared with 11 specimens of *swinhoei* from Kwangtung, differs from *swinhoei* by shorter bill and wing; by having the throat and upper breast washed with pale rusty (not pure white); the gray of the under parts darker; the under tail coverts dark ferruginous brown (not dark cinnamon).

Range: Kwangsi.

Remarks: The type, taken on June 20, is doubtless a worn bird, which fact may have some connection with its coloration, and its sex could account for its small size. There is, nevertheless, a strong likelihood that the population of Kwangsi is distinct from that of Fukien.

10. *Pomatorhinus erythrogenys erythrocnemis* Gould

Pomatorhinus erythrocnemis Gould, Proc. Zool. Soc. London, for 1862, pt. 3, Feb. 1863, p. 281 (Formosa).

Diagnosis: This form has the feathers of the crown with more nearly black centers and deeper rufescent-brown edges than *swinhoei*, so that this area is generally darker; the remaining upper parts as in *swinhoei*, but with the mantle chestnut-brown (not bright maroon-chestnut); the front, supraloral region, anterior auriculars, and under tail coverts maroon-chestnut; the posterior auriculars, sides of throat and breast, and flanks deep rufescent brown.

Range: Formosa.

PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON

A NEW AUSTRALIAN PHLAEOTHIRIPIDAE
(Thysanoptera: Tubulifera)

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Through the kindness of Dr. William L. Brown, Jr., of the Museum of Comparative Zoology, I have had an opportunity to study a number of interesting Australian thrips. One of these thrips, *Amphibolothrips* (*Verrucothrips*) *caenosa* described herein, is apparently the second known specimen of the group formerly assigned to the family Urothripidae to be discovered in that continent. The other "urothripid" specimen is the unique type species of *Octurothrips* Priesner. Both are from Victoria.

According to Doctor Brown these two entities probably came from different ecological areas. Healesville, the type locality of *Amphibolothrips* (*Octurothrips*) *pulcher*, generally is more constantly moist throughout the year than is the Victoria Valley, the type locality of *caenosa*. Although it is not known whether *pulcher* was found at the base of the Victorian Alps or higher on the slopes that border Healesville, it is possible that both species are subject to similar temperature conditions, cool in the winter and extremely hot in the summer. Most likely the dissimilar rainfall distribution in the two localities is responsible primarily for the difference in their habitats.

Amphibolothrips Buffa 1909

Almost at the same time that *Amphibolothrips* and *Bebelothrips* were described by Buffa, Bagnall brought forth his genus *Urothrips*. To Bagnall these genera seemed so different from the other Tubulifera that he erected the family Urothripidae for them. Eventually this family was placed in a suborder of its own, Polystigmata. The group had hardly reached such high standing before its rank slowly began to fall. In 1915 it was reduced to a superfamily, the Urothripodea. Meanwhile and since then, six more genera were proposed: *Stephanothrips* Trybom 1912, *Bradythrips* Hood and Williams 1925, *Trachythrips* Hood 1929, *Octurothrips* Priesner 1931, *Conocephalothrips* Bianchi 1946, and *Baenothrips* J. C. Crawford 1948. Finally in 1949 Priesner relegated Urothripodea to Urothripinae as a subfamily of Phlaeothripidae. I prefer to de-emphasize the taxonomic category of these aforementioned genera still further and make them all subgenera of the genus *Amphibolothrips*. As such the genus *Amphibolothrips* would be at the apex of the phyletic line that contains as more primitive members *Hoodiana*, *Areyothrips*,

Strepterothrips, *Stegothrips*, and *Idiothrips*. If desirable the genera of this pyletic line could be grouped as a tribe of the family Phlaeothripidae.

Diagnostic characteristics of *Amphibolothrips*:

Head—eyes small, anteriorly placed; antenna four- to eight-segmented, with the fusion of the segments occurring between segments III, IV, and V and/or between segments VII and VIII; postocular setae minute; prominent anterior, dilated setae absent or present by one to three pairs.

Mouth parts—Mouth cones broadly rounded; maxillary stylets (laciniae) slender extended far into the head when at rest.

Thorax—always apterous; praepectal plates large to rudimentary to absent; mesopraesternum usually, possibly always, reduced in size; prothoracic epimeral sutures incomplete; suture between meso- and metasternum usually absent; hind coxa slightly more distant from each other than the middle pair are from each other; all tarsi usually, possibly always, one-segmented.

Abdomen—segment I without a differentiated notal shield, the entire notum uniformly sclerotized; segment IX much longer than segment VIII; prominent anal setae four or six in number, each seta three or four times as long as tube.

These warty, brown and yellow thrips have been found in the warmer parts of all of the faunal regions except the Oriental region.

The placement of the hind coxae, the reduction of all tarsal segments to one, and the lack of a differentiated notal shield on abdominal segment I are unique characteristics in the Tubulifera. *Hoodiana* approaches *Amphibolothrips* in respect to the hind coxae, in that, according to Faure 1933, the hind coxae of *Hoodiana* are as close to each other as are the middle coxae. *Arcyothrips* and *Idiothrips* resemble *Amphibolothrips* not only in general form, but also by the fact that the notal shield is large and nearly covers abdominal segment I.

Verrucothrips new subgenus

Antenna eight-segmented, segment VIII without pedicel and closely joined to segment VII, segment VI not closely joined to segment VII, segment III with an exceptionally long pedicel. Head with three pairs of prominent anterior setae; tube with four long anal setae. Maxillary stylets widely spaced within the head, not touching.

Type species:—*Amphibolothrips* (*Verrucothrips*) *caenosa* new species.

This subgenus and *Octurothrips* are the only two subgenera which have eight segments in the antenna. *Octurothrips* differs *Verrucothrips* as follows:

Antennal segment VI, VII, VIII closely joined appearing
as a compact mass, fig. 2b; tube with six long anal
setae, fig. 2a.....*Octurothrips*

Antennal segment VI not closely joined to segment VII,
fig. 1b; tube with four long anal setae, fig. 1a.....*Verrucothrips*

Amphibolothrips (*Verrucothrips*) *caenosa* new species

Female (apterous): Length distended, exclusive of the antennae and setae, about 1.2 mm. General color brown with some yellow. Brown:

head, antennal segments I, IV to VIII, prothorax, legs, side of pterothorax, sides of abdominal segments I to IX, and tip of tube. Brownish yellow: median portions of the pterothorax and abdominal segments I to IX. Yellow: antennal segments II and III and most of tube. Red: subintegumental pigments of the head, thorax, and abdomen except the tube. These pigments are deposited along the sides of the head, along the sides of the abdomen, and throughout the prothorax.

Head, and prothorax, fig. 1c. Antennae, fig. 1b. Terminal segments of the abdomen, fig. 1a.

Holotype: female; Victoria Valley, Crampians Ra., Western district, Victoria, Australia; Sept. 25, 1951; (W. L. Brown, Jr.): from dead leafy branches of *Eucalyptus rostrata* in savannah woodland. Deposited in the collections of the Illinois Natural History Survey.

It seems worth while to mention that the trivial name, *caenosa*, was made feminine to agree with *Amphibolothrips*. Hinds and every other thysanopterist who followed him, including myself, have not been justified in considering *Thrips* and all generic combinations ending in thrips to be masculine. Clearly Linnaeus who first introduced the word thrips to zoological nomenclature ascribed to it the feminine gender. Even though the first *Thrips* species described by Linnaeus, *physapus*, seems to be a masculine adjective, actually it is not. Linnaeus took the name *Physapus* from De Geer and used it as a noun in apposition. His three other *Thrips* names were adjectives with feminine endings. Although thrips might have been considered to be masculine in Classical Latin, it does not necessarily follow that it was used as such in Medieval Latin. It seems best, therefore, to accept the gender employed by Linnaeus and continued in use by other zoologists for nearly 150 years.

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Explanation of Plate

a—tube, b—antenna, c—head and prothorax

fig. 1. *Amphibolothrips* (*Verrucothrips*) *caenosa* new species.

fig. 2. *Amphibolothrips* (*Octurothrips*) *pulcher* Priesner. (redrawn from Priesner 1931).

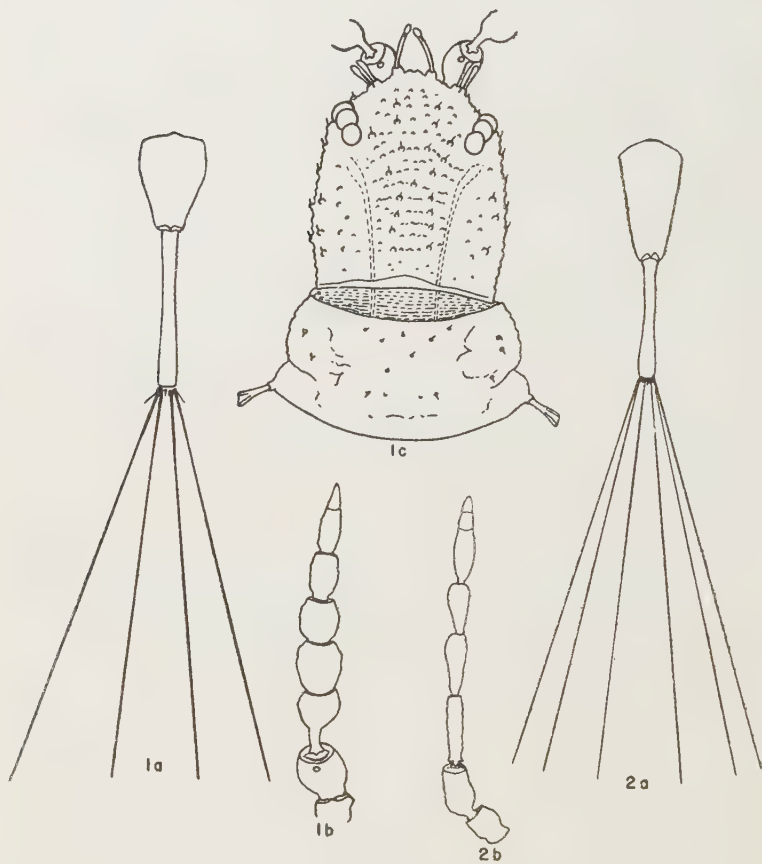


Plate VIII

PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON

A NEW SPECIES OF AMPHOROPHORA (APHIDIDAE)

By F. C. HOTTES

The species described herewith has been under observation since 1932, but it was not till this spring that alate viviparous females were collected. It was taken in small numbers on False Soloman's Seal, *Smilacina* sp. growing on a narrow ledge in Plateau Canyon a few miles East and South of Cameo, Colorado.

Amphorophora wahnaga new species

Alate viviparous female:

Size and general color.—Length from vertex to tip of anal plate varying from 2.28—2.35mm. Head and thorax pale dusky green. Abdomen very pale green, except for lateral dark dusky spots or areas in region of spiracles, anterior to cornicles. Antennae very pale dusky, with apical portions of segments darker. Legs pale dusky with apical regions of tibiae and tarsi darker. Cornicles pale except for dusky reticulated area. Cauda and anal plate concolorous with abdomen.

Head and thorax.—Antennal segments with the following proportional lengths: III .70mm., IV .58-.64mm., V .50-.60mm., VI .14+ I .14mm. The secondary sensoria are confined to the third segment, they are rather large, have wide rims, and are arranged in a straight row. In number the secondary sensoria vary from nine to twelve. Antennal hair fine, very short, and sparse. Rostrum short not attaining mesothoracic coxae, last two segments shorter than hind tarsi, also shorter than base of sixth antennal segment. Antennal tubercles well developed, anterior margin of head with a median tubercle. Second fork of media closer to margin of wing than to first fork. Radial sector much bowed. Hind tibiae I .85mm. long. Hind tarsi .128mm.

Abdomen.—Cornicles slightly swollen just anterior to reticulated area which measures .071mm. in length. Total length of cornicles .643-.67mm. The surface of the cornicles is feebly imbricated. Cauda .20mm. long not constricted with three hair at a side. Anal plate with few hair. Very few alate specimens seem to be produced, only two specimens having been taken since 1932, despite numerous attempts.

Apterous viviparous female:

Size and general color.—Length varying from 2.21-2.53mm. Head thorax and abdomen exceedingly pale whiteish-green, sometimes milk-white, except for black eyes. As a rule the tarsi are pale dusky, other appendages concolorous with body.

Head and thorax.—Antennal segments with the following comparative lengths: III .64-74mm., IV .47-60mm., V .47-.48mm., VI .10+ .80-

1.00mm. Secondary sensoria limited to base of third antennal segment, numbering from one to three, in about equal numbers. Rostrum short, attaining second coxae, or just failing to do so.

Abdomen.—Cornicles .715-.757mm. Cauda .243-.286mm. with three hair to a side. Abdominal hair very short and fine, and as in the case of the alate form exceedingly sparse.

Holotype alate viviparous female, May 22, 1952. Morphotype apterous viviparous female June 2, 1952. Both types deposited in the United States National Museum.

On its native host this species is never more than scarce, the adults living singly or associated with two or three young on the under sides of the leaves. It is never associated with ants. Its reproductive rate seems to be very slow. I suspect that it does not migrate to other hosts, having taken it on *Smilacina* throughout the season. *A. wahnaga* keys to *A. brevitarsis* Gillette and Palmer, in their key to species of this genus in *Annals of the Entomological Society of America*, Vol. XXVII, 1934. There is no question that the two species are very closely allied. *A. brevitarsis* varies greatly, both in size, and number of sensoria, as well as relative lengths of antennal segments tibiae and cornicles, so that in some of these respects some specimens intergrade with specimens of *A. wahnaga*. *A. wahnaga* differs from *A. brevitarsis* in the alate as follows: There are fewer sensoria, the presence of lateral dusky spots anterior to the cornicles, the position of the second fork of the media being closer to the margin of the wing rather than mid way, the radial sector being more bowed, and as a rule smaller in all respects. Apterous forms differ from *A. brevitarsis* in never having as many sensoria, in relative size and in color. Attempts were made to rear *A. wahnaga* on the host of *A. brevitarsis* but in no case did the specimens establish themselves.

Dr. D. Hille Ris Lambers would place this species in his genus *Oestlundia*.

Cinara wahnaga Hottes

Alate viviparous female:

Size and general color.—Length of mounted specimens from vertex to tip of anal plate varying from 2.14–2.28mm. Living specimens are not as long. Color of body similar to that of apterous viviparous female, and like these free from pulverulent matter and highly polished.

Head and thorax.—Proportional lengths of antennal segments as follows: III .30-.314mm., IV .143mm., V .171-.185mm., VI .042-.057+.028-.042 mm. Secondary sensoria limited to III and V. Arranged as follows: III 1-3 as a rule only one, V, I. Primary sensorium on VI large, with hair rim, marginal sensoria as a rule three but difficult to determine. Sixth segment thick, unguis pointed. Antennal hair exceedingly sparse, fine and short not over one third as long as width of segment, unlike most species of the genus. Anterior margin of head rounded with a median tubercle, provided with few hair similar to those on antennae. Head with a median suture. Rostrum extending to mid region of abdomen, not attaining cornicles. Ocular tubercles small. Length of hind tibiae I .17mm. Length of hind tarsi .12mm. Ventral surface of hind tarsis with about twelve hair. Costal margin of fore wing dusky with an accessory pigmented region beneath. Radial sector

feebly indicated, straight, arising from the inner margin of a rather blunt stigma. Media not indicated as a vein, but by V shaped scales, exceedingly faint and subject to much variation as to branching. Two specimens show the media simple. Five specimens show the media twice branched. Five specimens show the media once branched, some of these show M_1 missing others show M_{3+4} missing. The cubitus and anal veins are normal. Hair on outer margin of hind tibiae sparse.

Abdomen.—Base of cornicles .143-171mm. almost free from hair. Hair on abdomen sparse and similar to that of apterous viviparous female.

Morphotype altae viviparous female, deposited in the United States National Museum. Taken June 1, 1952 on the Colorado National Monument. Host *Juniperus utahensis*. The specimens were taken on the green twigs, and on twigs just beneath these. Thus far I have taken this species on only one tree. If the apterous viviparous females which I took in May were stem mothers, they are similar to other apterous viviparous females. The second generation seemed all to develop wings.

PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON

A NEW FORM OF HUMMINGBIRD FROM THE
PERIJA MOUNTAINS OF VENEZUELA AND COLOMBIA

BY ALEXANDER WETMORE AND WILLIAM H. PHELPS, JR.

From the higher elevations of the Sierra de Perijá on the northern boundary between the republics of Venezuela and Colombia we have four specimens of a hummingbird that represent an interesting link between *Coeligena eos* (Gould) of the Sierra de Mérida in northwestern Venezuela and *C. bonapartei* (Boissonneau) of the western slope of the eastern Andes in the Bogotá region of Colombia. The form in question, which is new to science, may be known as

Coeligena bonapartei consita subsp. nov.

Characters.—Similar to *Coeligena bonapartei eos* (Gould¹) but with brown spot on secondaries slightly smaller; tail green throughout instead of partly hazel; chin and throat much less spotted with iridescent green; lower breast and side more extensively green, and under tail coverts spotted with iridescent green.

Description.—Type, Phelps coll. no. 54415, (on deposit in the U. S. National Museum), female, southeastern base of Cerro Tetarí, at 2900 meters elevation, Sierra de Perijá, Zulia, Venezuela, taken April 21, 1952 by R. Urbano. Crown and hindneck iridescent cerro green; upper back and lesser, middle and primary wing coverts iridescent oil green; lower back somewhat lighter, with bronze reflections that merge with with the iridescent reddish bronze of the rump and upper tail coverts; secondaries cinnamon, tipped slightly with fuscous; primaries fuscous, the outer one edged lightly with yellow ocher; rectrices bronze green, the outer one on each side tipped and edged on outer web with vinaceous buff; chin, throat and side of head below lores from center of eye to base of mandible cinnamon buff, with small, scattered spots of iridescent oil green along lateral and posterior borders; foreneck, sides of neck and upper breast iridescent oil green, the feathers dull whitish basally; lower breast, sides and flanks lighter iridescent green with bronzy reflections; abdomen and under tail coverts cinnamon-buff, the latter iridescent green centrally; edge of wing pinkish cinnamon; outer under wing coverts shining oil green; inner under wing coverts and axillars cinnamon. Bill black; lower tarsus and toes fuscous.

Measurements.—4 females, wing 72.0-75.9 (73.8), tail 41.5-44.6 (43.5), culmen from base 30.4-32.5 mm.

Type, female, wing 72.0, tail 44.1, culmen from base 31.0mm.

Range.—Higher elevations of the Sierra de Perijá at 2900 meters

¹*Helianthea Eos* Gould, Proc. Zool. Soc. London, pt. 16, April 13, 1848, p. 11, pl. 1. ("Highlands of New Grenada and Venezuela." herein restricted to the higher elevations of the Sierra de Mérida, Venezuela.)

on Cerro Tetarí, Zulia, Venezuela, and at 2900 meters on the base of the southern Teta above Hiroca, Magdalena, Colombia.

Remarks.—This hitherto unknown form is described from three specimens in the Phelps collection taken by R. Urbano March 31, April 2, and April 21, 1952 on the Cerro Tetarí on the Venezuelan side of the Perijá range, and one from the western slope in Colombia, near the base of the southern Teta above Hiroca, collected by M. A. Carriker, Jr., May 4, 1942. All are females, the male being as yet unknown. The following discussion of forms therefor concerns females only.

In the diagnosis comparison has been made solely with *Coeligena bonapartei eos* as the form most closely related. From *Coeligena bonapartei bonapartei* (Boissonneau) the new race differs in having the secondaries brown forming a distinct spot; the crown and back slightly lighter, more bronzy green; the throat and under tail coverts paler brown; and the abdomen slightly less iridescent green. The three birds under discussion are strikingly similar in general appearance, and in the total sum of their characters evidently are closely related and of the same general stock.

The general structure in the three is identical, as is the size. The light brown secondaries that form a prominent mark on the wings of *eos* and *consita* seem at first glance to be a prominent difference in pattern that might set these two apart as a distinct species. On careful examination of the series of *bonapartei* at hand we find that while most have the secondaries fuscous like the primaries occasional specimens show a slight mixture of brown in the concealed portion of the secondary feathers, indicating a slight intergradation in this character. These are trade skins so that the locality is not known, but it appears that they must be considered sufficient approach to the other two to warrant placing all three under the same specific name.

The collection of males of *C. b. consita* will be awaited with interest. We may hope also sometime for material from the Cordillera Oriental, and from the southern Sierra de Perijá in the region controlled by groups of Motilone Indians, who at present do not permit strangers to enter, that will demonstrate more clearly intergradation with *bonapartei*.

Material examined (all females):

Coeligena bonapartei eos.—Sierra de Mérida, Venezuela; 2, Páramo La Culata; 1, Páramo El Morro; 1, Montañas Sierra; 6, Páramo El Escorial.

Coeligena bonapartei consita.—Sierra de Perijá; 3, 2900 meters on Cerro Tetarí, Zulia, Venezuela; 1, 2900 meters above Hiroca, Magdalena, Colombia.

Coeligena bonapartei bonapartei.—Cordillera Oriental, Colombia; 1, El Peñon, above Fusagasuga, Cundinamarca; 20, Bogotá trade skins.

PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON

A NEW FRANKLINIELLA INJURIOUS TO BANANA
(THYSANOPTERA, THRIPIDÆ)

By J. DOUGLAS HOOD

The thrips described below is of some economic importance, and has been a subject of study by entomologists of the United Fruit Company for more than twenty years. It is apparently confined to the island of Hispaniola (Haiti), though other members of its genus are responsible for the same type of damage to the fruit of the banana in other areas. Should it merit a common name, Haiti Banana Thrips is suggested.

Frankliniella musaeperda sp. nov. (Fig. 1).

Female (macropterous).—Length about 1.3 mm. (distended, 1.6 mm.). Color pale yellow, head whitish, body without dark markings, internal pigmentation yellow, ocellar pigmentation deep red; legs somewhat paler than body; antennæ with segments I-III nearly colorless, II with orange pigmentation across tip, IV nearly colorless in about basal half, lightly shaded beyond, V paler than IV because shaded only at apex, VI-VIII yellowish gray; fore wings uniform pale yellowish; setæ yellowish gray, those on the two apical abdominal segments and the large dorsal pair on segments II and III of antennæ darkest.

Head about as long as its width across base and about 0.84 as long as width across eyes, the width at anterior fourth of cheeks somewhat less; cheeks convex, rounded to eyes and to base, without postocular angulation and with only a slight tooth at the faint occipital line; dorsum with pale, faint, widely-spaced cross-striæ in the area posterior to eyes, these producing a faint serration in posterior half, or less, of cheeks; interocellar setæ long ($64\ \mu$), arising just outside line connecting centers of median and posterior ocelli; postocular setæ much shorter ($40\ \mu$) and about $125\ \mu$ apart; minor setæ minute and nearly colorless, disposed as usual in the genus. *Eyes* ($80\ \mu$) half as long as width of head across them. *Ocelli* $16-17\ \mu$ in diameter, the posterior ones about $36\ \mu$ apart and about $20\ \mu$ from median ocellus. *Antennæ* about 2.1 times the length of head; segment II elevated on dorsum at apex and produced, its setæ long ($28\ \mu$) and conspicuous; III (Fig. 1) slender, nearly three times as long as wide ($61 \times 21\ \mu$), its apical setæ about $38\ \mu$, basal portion of its pedicel about $7\ \mu$ long and broadened subapically to form a sharp, shelf-like angulation which is about $11\ \mu$ across, the part distal to the shelf very short and with concave sides, apical portion of pedicel not differentiated; sense-cones as in allies.

Prothorax about equal in length to head, its width about 1.4 times its

length, surface without striæ; major setæ long, dark, the antero-marginals about 84 μ , antero-angulars 73, outer at posterior angles 87, inner 83, large submedian pair on posterior margin 58; minor prothoracic setæ pale, normal in form, number, and arrangement. *Fore wings* about 0.7 mm. long, costa with about 21 setæ, anterior vein with about 20, posterior vein with about 14.

Abdomen normal in form and structure, about 1.4 times as broad as prothorax; tergum VIII with comb on posterior margin complete and regular, composed of about 16 microtrichia, the longest about 15 μ ; segment IX with seta I about 105 μ , II 116, III 120; segment X with seta I 122, II 117.

Measurements of female (holotype), in mm.: Length 1.3 (distended, 1.6); head, total length 0.134, width across eyes 0.160, just behind eyes 0.153, across cheeks at about anterior fourth 0.157, at base 0.134, length in front of eyes 0.111, width in front of eyes 0.067; prothorax, median length 0.137, width 0.191; mesothorax, greatest width 0.255, metathorax 0.251, abdomen (at segment IV) 0.265. Antennal segments (μ): I 26 (30), II 44 (24), III 61 (21), IV 47 (20), V 36 (18), VI 47 (17), VII 8 (7), VIII 13 (5).

Male (macropterous).—Smaller than female (length about 1.0 mm.), but very similar in color and general structure; segment III of antennæ as in female.

DOMINICAN REPUBLIC: Puerto Libertador, July 24-August 31, 1951 (holotype, July 30), C. F. Dowling, Jr., F. S. Roberts, and P. Bournigal, 21 ♀♀, from flowers and buds of banana.

HAITI: L'Arcail, May 26, 1933, James Zetek, 6 ♀♀ and 3 ♂♂ (including allotype), from young banana fruit [Hood No. 1069].

Very close to *F. cubensis* Hood, but somewhat larger, with the third antennal segment longer and more slender (compare Figs. 1 and 2), and the cephalic and pronotal setæ longer.

The following notes are from my number 1069, and were made in 1933: "Mr. Zetek brought from Haiti young banana fruits, and I examined them at Barro Colorado Island in June, 1933. They were covered with small dark pustules, perhaps 1/16 of an inch in diameter and half that high, made, I thought, by feeding punctures. Zetek says, however, that Mr. Johnson, of the United Fruit Company, states that they are oviposition punctures around which the tissues have proliferated, probably in response to the egg within. Johnson says, according to Zetek, that he has reared thrips from eggs which he was able to find in the pustules. The injury renders the fruit unmarketable. The same injury is caused on Barro Colorado Island, Canal Zone, Panama, by another species of *Frankliniella*."

Frankliniella cubensis Hood (Fig. 2).

1925. *Frankliniella cubensis* Hood, Bull. Brook. Ent. Soc., 20 (2): 74 Pl. III, Fig. 3.

1948. *Frankliniella cubensis*, Moulton, Rev. de Ent., 19 (1-2): 107, Fig. 39.

Moulton's figure, cited above, is extremely inaccurate. The form of

the third antennal segment is wholly wrong; and the setæ at its tip, as well as those on the second segment, are far too short (see my original figure of the holotype, cited above, and the figure given in the present paper). The species may have a synonym or two, but further material from various areas needs careful study before any worthwhile conclusions can be presented.

[Explanation of figures]

Fig. 1. *Frankliniella musaeperda* sp. nov., holotype, segment III, right antenna.

Fig. 2. *Frankliniella cubensis* Hood, holotype, segment III, right antenna.

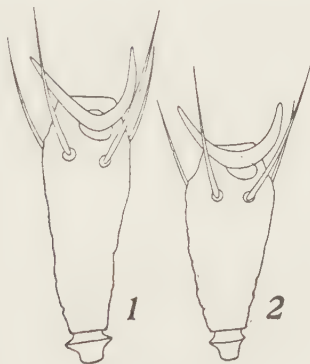


Plate IX

PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON

BRASILIAN THYSANOPTERA. III

BY J. DOUGLAS HOOD

The two preceding papers in this series appeared in *Revista de Entomologia* (Rio de Janeiro), vols. 20 (1949) and 21 (1950), and were illustrated with a total of 137 figures. That journal, unfortunately, has had to suspend publication. For the present paper, a similarly exhaustive treatment was planned, a proportionately large number of illustrations were prepared, and the initial descriptions of the new genera and species were fully detailed. But present conditions have forced our journals to publish only brief, non-illustrated contributions unless the author himself defrays the increased costs. Hence, rather than sacrifice the results of much collecting done by myself and others in Brazil—financed in part by Cornell University through grants by the Trustee-Faculty Committee on Research and by a Traveling Fellowship from the College of Agriculture—it has seemed best to solve the problem of publication as I have on similar past occasions: by abbreviating the descriptions and omitting the illustrations. To conform to the title used in parts I and II of this study, the geographic adjective is spelled with an S, although throughout the text the name of the country is given as Brazil, as in current practice.

1. *Erythrothrips brasiliensis* sp. nov.

Male much like that of *costalis*, only, in coloration of wings, but much smaller, with head only 1.1 times as long as wide, third antennal segment ($107\ \mu$) only four times as long as wide, abdominal terga V-VIII without lobe or flange at sides of posterior margin, tergum VIII not deeply emarginate either anteriorly or posteriorly, the median length of this segment about $97\ \mu$, in comparison with a ventral length of $106\ \mu$.

Color of head, thorax, and abdomen dark blackish brown, with abundant red internal pigmentation; legs and antennæ about concolorous with body, excepting the yellow fore tarsi, the yellowish fore tibiae which are clouded with gray-brown dorsally, the yellow outer apical half of antennal segment II, and the pale yellow basal two-thirds of III; fore wings with posterior half (including anal area), and the area of the ambient vein along distal two-thirds of anterior margin, dark blackish brown. Length about 1.7 mm. (distended, 2.1 mm.); head, total length 0.217, width across eyes 0.197, across cheeks 0.199, width in front of oc-

capitulum 0.178; eyes, dorsal length 0.098; prothorax, median length of pronotum 0.156, width (exclusive of coxæ) 0.245; mesothorax, greatest width, 0.330; metathorax (posteriorly) 0.314; abdomen (at segment IV) 0.280; fore wings, length 0.952. Antennal segments (μ): I 43 (41), II 64 (33), III 107 (28), IV 97 (31), V 70 (27), VI 66 (27), VII 69 (26), VIII 22 (15), IX 15 (8).

BRAZIL: Nova Teutonia, S.C., October 15-20, 1949, Fritz Plaumann, 1 ♂, from *Dalbergia*.

AULACOTHRIPS gen. nov.*

Family Heterothripidae. Head longer than wide, with a pair of strong knobbed setæ in front of, and another behind, posterior ocelli; mouth-cone very short, broadly rounded. Antennæ 9-segmented; segments III and IV greatly elongated and thickened, together fully twice as long as all of the other segments combined, their sensoria in the form of loops (much as in *Eucecatothrips*); V-IX collectively forming a short cone at the tip of IV. Prothorax with seven pairs of long, stout, knobbed setæ disposed about as in the Tubulifera; fore tarsi with the usual thumb-like process; scutellum well developed, triangular, heavily reticulate, with overhanging, wing-retaining lateral margins; fore wings in distal three-fourths extremely narrowed and with a strong post-median vein, their basal fourth (exclusive of anal area) nearly four times as wide and with six heavy knobbed setæ comparable with those of head and prothorax, anal area with three. Abdomen with a deep median dorsal furrow in segments II-VIII, this furrow margined with wing-retaining setæ and, in each segment at middle, with a pair of long, approximate, converging setæ; posterior margins of terga I-VIII fringed with a series of strong acute teeth which are replaced by long delicate microtrichia in the dorsal furrow; IX longest, pubescent dorsally; major abdominal setæ, exclusive of the wing-retaining ones (even those on X), knobbed at tip; subbasal line of III-VIII very heavy.

Type species: *Aulacothrips dictyotus* sp. nov.

2. *Aulacothrips dictyotus* sp. nov.

Dark brown, with trochanters and tarsi nearly yellow, fore tibiae paler apically, segment III of antennæ paler than others and more yellowish; wings blackish brown, fore pair pale in middle of broadened basal fourth. Body stout, thick, heavily sclerotized, polygonally reticulate in metathorax and abdomen. Length 1.9 mm.; head, length 0.190, width across eyes 0.192, least width just behind eyes 0.178, greatest width across cheeks 0.188, least width at base 0.168; ocellar setæ 0.038, interval 0.057; postocellars 0.043, interval 0.036; prothorax, median length of pronotum 0.223, greatest width 0.281; fore wings, length 1.09, greatest subbasal width (exclusive of anal area) 0.092, width at middle 0.025; segment VIII of abdomen, length 0.151, IX 0.171, X 0.113. Antennal segments (μ): I 32 (44), II 42 (36), III 115 (50), IV 137 (49), V 9 (20), VI 10 (15), VII 13 (11), VIII 12 (9), IX 15 (6).

BRAZIL: Nova Teutonia, Santa Catarina, S. P., Jan. 15 and May 25, 1949, Fritz Plaumann, 2 ♀♀, from "Compositæ, No. 41" and *Solanum*, respectively.

**Aulax*, a furrow or groove; *thrips*, a wood-worm—in allusion to the dorsal abdominal furrow for the reception of the wings.

Family UZELOTHRIPIDAE nov.

Superfamily Thripodea. Distinguished by the whip-like antennæ, which are extremely slender beyond segment III, with the terminal segment setiform and about one-half the length of all the others combined; by the depressed sensorium on the ventral surface of the third antennal segment; by the presence of a dorsal cervical sclerite between the head and pronotum; by the slender wings, broadly rounded at tip; by the absence of sclerotization in the sternum of the eighth abdominal segment and in all of the ninth excepting its tip; and by the non-functional, vestigial ovipositor. One genus known.

UZELOTHRIPS gen. nov.*

Body minute, stout, with numerous dorsal tubercles. Head with a pair of large rounded humps between eyes, a deep channel between them, the humps tuberculate and with three pairs of heavy infundibuliform setæ, the anterior pair of setæ largest; eyes subspherical, strongly protruding, with numerous tubercles between the well-separated facets; mouth-cone very heavy, longer than head, broadly rounded at apex, maxillary palpi 3-segmented, labial palpi 2-segmented. Cervix with a transverse median dorsal sclerite articulated with anterior margin of pronotum. Antennæ rising from a short, thin, cup-like prolongation of dorsum of head, 7-segmented, the last four segments extremely slender and forming a flagellum, the terminal segment (in the type species) one-half as long as all of the others combined and fully eighteen times as long as greatest width; segment III (possibly III + IV, morphologically) constricted near middle and with a circular depressed sensorium on ventral surface near tip, IV and V each with a minute thumb-like sense-cone on outer surface; setæ minute, very few in number, most of those on II and III dilated apically, VII with a sharp terminal spine or seta. Prothorax trapezoidal, heavily tuberculate, posterior angles conically projecting and thus prominent, with seven pairs of very broadly dilated setæ arising from prominent tubercles, its posterior margin dentate. Mesothorax, metathorax, and the first eight abdominal segments of apterous form margined posteriorly with a series of strong projecting teeth, in macropterous forms these teeth lacking from meso- and metathorax; major abdominal setæ similar to those on prothorax and also arising from strong tubercles. Wings about thirteen times as long as broad, rounded at tip, without discernible venation, two dilated setæ at base. Legs short and stout. Abdomen weakly sclerotized ventrally, especially in segments VIII and IX, the sterna of which are membranous, IX membranous dorsally (except at apex) and protrusile; ovipositor vestigial.

Type species: *Uzelothrips scabrosus* sp. nov.

3. *Uzelothrips scabrosus* sp. nov.

Dark blackish brown (black to naked eye), with red internal pigmentation; legs concolorous with body; antennæ with segment III darker than the others; wings gray. Length about 0.57 mm. (fully distended, 0.064 mm.). Macropterous ♀: head, total length 0.061, median dorsal length 0.049, width across eyes 0.103, least width just behind eyes 0.076, greatest width across cheeks 0.089; eyes, dorsal length 0.038,

*Named in honor of Heinrich Uzel.

width 0.027, interval 0.056; mouth-cone, length beyond dorsal margin of head 0.076; prothorax, median length 0.086, width (inclusive of tubercles) 0.174, setæ about 0.014; cervical sclerite, length 0.005, width 0.060; mesothorax, width 0.182, metathorax 0.206; fore wings, length 0.473, width 0.036; abdomen, greatest width (at segment IV) 0.213. Antennal segments (μ): I 17 (26), II 29 (25), III 48 (21), IV 27 (10), V 36 (7), VI 30 (6), VII 94 (5).

Apterous female not markedly different.

Male very similar to female; length 0.5 mm.

BRAZIL: Belém, Pará, July and August, 1951, J. D. H., many specimens from dead branches of *Hevea* and *Bixa*.

4. *Sericothrips hemileucus* sp. nov.

Readily known from all congeners which have the seventh abdominal segment much darker than the sixth, and the fore wings white at tip and with two white cross-bands, by the uniform white or yellow color of pronotum and of last three abdominal segments.

Color of head, meso- and metanotum, and abdominal segments II-IV and VII, dark brown, head darkest, remainder of body white by reflected light, yellowish by transmitted light; no dark pronotal blotch;* dark abdominal segments with subbasal line nearly black; legs pale yellowish or white, fore coxæ and all femora more or less shaded with brown; fore wings black in first, third, and fifth sixths, approximately, remainder white, but with the second dark band a little broader and the terminal white one narrower; antennæ white in segments I and II, uniform dark gray in VI-VIII, the intermediate segments pale gray, but with pedicel of III basally nearly colorless, and its narrowed portion just beyond, as well as its extreme tip and the pedicels of IV and V, as well as their apical two-fifths and one-half, respectively, shaded with darker. Length about 1.1 mm. (distended, 1.3 mm.); head, total length 0.107, width across eyes 0.152, across cheeks 0.136, at basal apodeme 0.120, head very finely striate excepting in occipital groove, its larger setæ (including about four in dorsal part of eye) stout and nearly black, the postocellars 34 μ ; eyes, dorsal length 0.070; mouth-cone 0.150, slender and dark at tip; pronotum, length 0.126, width 0.179, its cross-striæ pale and delicate, setæ at posterior angles nearly black, 64 μ long and more than 3 μ in diameter, other setæ paler, the pair near middle of posterior margin 29 μ ; mesothorax, width 0.252, metathorax 0.245, abdomen (at segment IV) 0.294; wings 0.81; meso- and metanotum with fine dark close striæ like head. Antennal segments (μ): I 20 (26), II 44 (27), III 64 (17), IV 58 (17), V 50 (17), VI 53 (16), VII 13 (6), VIII 15 (5).

BRAZIL: Boracéia, Munic. de Salesópolis, S.P., June 8, 1948, J.D.H., 2 ♀♀ (including holotype), from dead branches.—Nova Teutonia, S.C., Jan. 8, 1949, Fritz Plaumann, 1 ♀, from *Solanum*.

5. *Leucothrips pictus* sp. nov.

Unique in (1) antennæ 8-segmented; (2) sense-cones unusually long, the outer arm of that on segment IV 52 μ and attaining middle of VI, that on VI 60 μ and attaining tip of antenna; and (3) color pale yellow,

*Mr. J. C. Crawford (Proc. Ent. Soc. Wash., 46:200, 1944) contends that the "pronotal blotch of authors" is the protergum. It is not.

with pterothorax orange, head with frontal red blotch as in *theobromæ*, red pigment also in first antennal segment, along sides of head, prothorax, and first eight abdominal segments, and also in each of the two veins of fore wing for a short distance just beyond middle (remainder of fore wings colorless excepting for gray tips; femora slightly darkened apically and tibiae subbasally; antennae very pale grayish, segments II and III nearly colorless basally, II with orange pigment at apex, III pale gray in apical two-thirds, IV darkened in apical two-fifths, V in apical third, V in apical half).

Length about 0.78 mm. (distended, 0.87 mm.); head, length 0.074, width across eyes 0.136, across cheeks just behind eyes 0.120, at base 0.105; eyes, dorsal length 0.053; prothorax, median length 0.070, width (exclusive of coxae) 0.149; pronotum with fine, pale, transverse lines of sculpture, setae colorless and slender, the pair at posterior angles 27μ , the mediad of four additional pairs on posterior margin longest and 24μ ; mesothorax, greatest width 0.185, metathorax 0.181; mesonotum sculptured like pronotum, metanotum similarly but longitudinally striate; fore wings 0.578, fringe not wavy, anterior vein with 6 setae, the distal one straighter, longer, stouter, and dark; abdomen, greatest width 0.204, segment VIII with complete comb, all setae pale yellowish, dorsal pair on VIII and IX 43μ and arising from posterior margins, IX with two pairs of stouter lateral ones ($27-28\mu$), the upper of these curved at tip, X with dorsal pair straight and fine, the outer stout and curved at tip, both 33μ . Antennal segments (μ): I 16 (20), II 27 (25), III 30 (16), IV 33 (15-16), V 28 (13), VI 24 (10), VII 21 (6), VIII 13 (3).

BRAZIL: Nova Teutonia, S.C., Nov. 17-18, 1949, Fritz Plaumann, 1 ♀, from unidentified plant.

6. *Pseudodendrothrips alboniger* sp. nov.

Unlike congeners in color: head, thorax, and abdominal segments IV-X dark gray brown (black to naked eye), the three basal abdominal segments (and usually the anterior part of fourth) white, segments IV-VI with an obscure pale spot near sides, the sides of metathorax and of the dark abdominal segments underlain with red pigmentation; fore wings very dark gray in basal fifth, white to middle, dark again to the white apical seventh; second antennal segment white, others light gray, III darkest, IV nearly colorless briefly beyond pedicel; fore and middle coxae and femora concolorous with body, fore tibiae paler than middle ones, both pairs nearly colorless at either end; hind legs (including coxae) pale yellow or white, their femora and tibiae with a narrow dark ring near base; all tarsi pale.

Length about 0.74 mm. (distended, 0.88 mm.); head, length 0.077, width across eyes 0.140, across cheeks just behind eyes 0.123, at base 0.113; eyes, dorsal length 0.051; prothorax, median length 0.071, width (exclusive of coxae) 0.152; pronotum with close black lines of sculpture, with dark granulations between the striae, setae brown, conspicuous, the pair at posterior angles 33μ , the median of three additional pairs on posterior margin largest and 31μ , the inner of two pairs across anterior portion of disc 43μ ; mesothorax, greatest width 0.197, metathorax 0.195; mesonotum sculptured like pronotum, metanotum similarly but longitudinally striate; fore wings 0.553, fringe not wavy, anterior vein

with about 9 setæ, those in white areas white, others black, the distal one much the longest; abdomen, greatest width 0.220, segment VIII with complete comb, setæ on pale segments colorless, those on other segments dark, dorsal pair on VIII and IX 43-46 μ and arising from posterior margins, IX with two pairs of stout lateral ones, each 31 μ , the upper of these curved at tip, X with dorsal pair 35 μ , straight and fine, the outer pair 41 μ , stout, curved at tip; microtrichia on dark segments black and very conspicuous. Antennal segments (μ): I 15 (22), II 30 (25), III 33 (16), IV 29 (16), V 26 (14), VI 29 (10), VII 7 (6), VIII 15 (4), IX 12 (3).

Male identical with female in color and general structure.

BRAZIL: Nova Teutonia, S.C., Nov., 1949, 17 ♀♀, 6 ♂♂, from *Terminalia* and unidentified plants.

7. *Pseudodendrothrips fulvus* sp. nov.

Like *ficus*, only, in that abdomen is largely yellow and with bases of terga II-VIII transversely banded with darker; differs conspicuously as follows: tergal bands confined to subbasal lines and the areas anterior to them; antennæ with segment I pale, II-IX dark gray-brown, with pedicels of III-V, only, pale; transverse sculpture of II conspicuous, strongly raised, giving a serrated appearance to sides of segment; sutures between VI-VIII transverse; head finely longitudinally striate in front of ocelli; nine setæ near or on vein of fore wings, all stout, black, and conspicuous, the apical one short (15 μ); two strong spurs at tips of hind tibiæ.

Color reddish orange; pronotum with an obscure gray blotch on either side; abdomen with subbasal lines on terga IV-VIII nearly black (pale medially on IV and V), extreme bases of these segments and of II and III gray; legs yellow, with orange pigmentation in femora; fore tibiæ with an obscure ring around middle and also at apex; fore wings gray, darkest basally and in anal area, veins orange. Length about 1.2 mm. (distended, 1.32 mm.); head, length 0.091, width across eyes 0.174, across cheeks behind eyes 0.158, at base 0.129; eyes, dorsal length 0.075; prothorax, median length 0.095, width (exclusive of coxæ) 0.178; pronotum with close light gray lines of sculpture and with extremely delicate longitudinal lines between the striæ, setæ at posterior angles (19 μ) darkest, nearly black, stout, straight, thorn-like, the outer of two additional pairs on posterior margin also dark but curved and slenderer, the inner pair (11 μ) pale, the inner of two pale pairs across anterior portion of disc 19 μ ; mesothorax, greatest width 0.241, metathorax 0.245; mesonotum sculptured like pronotum, metanotum similarly but indistinctly longitudinally striate basally; fore wings 0.798, fringe not wavy; abdomen, greatest width 0.308, segment VIII with complete comb, dorsal pair of setæ on VIII and IX 57 μ and arising from posterior margins, IX with two pairs of stout, thorn-like lateral setæ (36-37 μ , diameter 3 + μ), both straight and nearly black, thickest at middle, X with dorsal and lateral pairs stout, dark, straight, 25 and 30 μ , respectively; microtrichia pale gray. Antennal segments (μ): 19 (24), II 35 (28, exclusive of sculpture), III 34 (20), IV 32 (20), V 32 (18), VI 29 (16-17), VII 11 (9), VIII 12 (7), IX 12 (4).

BRAZIL: Nova Teutonia, S.C., October 15-20, 1949, Fritz Plaumann, 1 ♀, from *Dalbergia*.

8. *Chirothrips nigriceps* sp. nov.

Distinctively colored (yellow, with black head), and known from other pale species by non-pubescent abdomen, four pairs of setæ in front of eyes, interocellars slightly in advance of median ocellus, and cephalic production $9\ \mu$ between eyes and antennæ.

Antennal segment I enlarged, II asymmetrical, IV with large sense-cone simple; head in front of eyes much more than twice as wide as long; fore tibiæ normal; mesonotum with two pairs of setæ.

Length 1.4 mm.; head, length 0.116, width across eyes 0.110, greatest width across cheeks 0.106, least width near base 0.103, prothorax, length 0.180, width 0.266, width across fore margin 0.129. Antennal segments (μ): I 28 (42), II 28 (34), III 30 (24), IV 29 (25), V 26 (20), VI 34 (19), VII 10 (6), VIII 12 (4).

BRAZIL: Nova Teutonia, Santa Catarina, Oct. 15-20 and Nov. 20, 1949, 2 ♀ ♀, one (holotype) from *Dalbergia*.

9. *Podothrips paraensis* sp. nov.

Like type of genus, only, in having legs completely yellow, but with head exceptionally broad and with 5-6 accessory hairs on fore wings.

Color light yellowish brown, tube darkest and yellow at base; legs deep golden yellow, the femora almost indistinguishably darkened with brown externally; antennæ about concolorous with body excepting segment I which is paler and more yellowish, II which is golden yellow, and extreme bases of III-VI which are yellowish; fore wings almost clear, faintly yellowish at base. Length about 1.8 mm. (distended, 2.1 mm.); head, total length 0.216, width across eyes 0.203, across cheeks 0.221, near base 0.172; eyes, dorsal length 0.067; postocular setæ 0.060, interval 0.208, distance from eyes 0.025; prothorax, median length 0.209, width across coxæ 0.364; antero-marginal setæ minute, antero-angular 0.031, midlateral 0.039, epimeral 0.073, postero-marginal 0.071, coxal 0.071; mesothorax, width across anterior angles 0.323; metathorax, greatest width 0.323, abdomen (at segment V) 0.314; fore wings 0.77; tube, length 0.117, subbasal width 0.062, apical width 0.037, terminal setæ 0.382; segment IX, seta I 0.101, II 0.090, III 0.122. Antennal segments (μ): I 40 (53), II 53 (33), III 54 (34), IV 50 (33), V 49 (30), VI 46 (27), VII 47 (23), VIII 36 (13).

BRAZIL: Belém, Pará, August 4, 1951, J. D. H., 1 ♀, from dead branches of *Hevea*.

10. *Trichinothrips callipechys* sp. nov.

Differing from Oriental species in that head is longer than wide; from Neotropical species in that the third antennal segment is somewhat longer than the fourth, the legs are differently colored, and the head is broadest near middle of cheeks, with the latter rounded to eyes and to base.

Color dark brown; antennal segment II paler apically, III basally, remainder of antenna gray-brown; mid and hind tibiæ nearly as dark at middle as femora, almost white basally, the femora pale at tip; antennal

segment I broad ($42\ \mu$) at base and short ($28\ \mu$), inner margins forming an angle greater than 90° , outer margins parallel; sense-cones of normal length and disposition; head little produced between eyes and antennæ; segments VIII and IX of abdomen with one pair of small dorsal setæ in the region of the two dorsal pores. Length 1.8 mm. (distended, 2 mm.); head, total length 0.202, width across eyes 0.167, greatest width across cheeks 0.174, least width near base 0.154, length in front of eyes 0.027, width in front of eyes 0.080, lateral length between eyes and antennæ 0.003; eyes, dorsal length 0.080; postocular setæ 0.076, interval 0.135, distance from eyes 0.014; minor cephalic setæ about 0.037; prothorax, median length 0.133, width across coxæ 0.294, antero-marginal setæ 0.073, antero-angular 0.067, midlateral 0.082, epimeral 0.094, postero-marginal 0.071, coxal 0.060; mesothorax, width across anterior angles 0.290; metathorax, greatest width 0.312, abdomen (at segment IV) 0.375; fore wings, length 0.623; tube, length 0.093, subbasal width 0.071, apical width 0.034, terminal setæ 0.132; segment IX, seta I 0.101, II 0.104, III 0.108. Antennal segments (μ): I 28 (42), II 54 (29), III 50 (27), IV 48 (27), V 45 (25), VI 40 (24), VII + VIII 59 (21).

BRAZIL: Santarém, Pará, July 12, 1951, J. D. H., 1 ♀ (holotype), from dead branches.—Jacarepaguá, D. F., May 27, 1948, J.D.H. and Dr. Thomaz Borgmeier, 1 ♀, from miscellaneous low vegetation.

11. *Trichinothrips sensilis* sp. nov.

Unique in having all tibiae yellow and only very obscurely shaded with brown; in the long sense-cones, the outer on III $110\ \mu$, outer two on IV $117\ \mu$, outer on V $100\ \mu$; and in having 4-5 pairs of small dorsal setæ on abdominal segments VIII and IX in the immediate area of the two dorsal pores.

Color dark brown; antennal segment II paler apically, III basally, remainder of antennæ gray-brown. Length about 1.7 mm. (distended, 2.17 mm.); head, total length 0.239, width across eyes 0.199, greatest width across cheeks immediately behind eyes 0.199, least width near base 0.164, cheeks straight, length in front of eyes 0.034, width in front of eyes 0.088, lateral length between eyes and antennæ 0.010; eyes, dorsal length 0.104; postocular setæ 0.062, interval 0.154, distance from eyes 0.011; minor cephalic setæ about 0.022; mouth-cone, length beyond posterior dorsal margin of head 0.083; prothorax, median length 0.138, width across coxæ 0.294, antero-marginal setæ 0.052, antero-angular 0.062, midlateral 0.057, epimeral 0.067, postero-marginal 0.061, coxal 0.056; mesothorax, width across anterior angles 0.288; metathorax, greatest width 0.308, abdomen (at segment IV) 0.319; fore wings 0.792; tube, length 0.104, subbasal width 0.067, apical width 0.033, terminal setæ 0.068; segment IX, seta I 0.104, II 0.162, III 0.106. Antennal segments (μ): I 35 (44), II 60 (32), III 63 (33), IV 72 (33), V 66 (32), VI 55 (28), VII + VIII 61 (22).

BRAZIL: Jacarepaguá, D. F., May 9 (holotype) and May 19, 1948, J. D. H. and Thomaz Borgmeier, 2 ♀ ♀, from dead branches.

12. *Hoplothrips spissicornis* sp. nov.

Small, yellow, with head 1.2 times as long as wide and fully 1.7 times the length of tube, eyes protruding; antennæ very stout, formed almost

precisely as in *pergandei*, terminal segment lanceolate and pedicellate, major sense-cones as in that species; fore tarsal tooth nearly as long as width of tarsus; wings with about six accessory hairs; antero-marginal setae minute (about $10\ \mu$) and pointed, the postocular and other prothoracic setae, the subbasal wing setae, and seta I on abdominal terga I and VIII, dilated and divided at tip, other abdominal setae pointed; all setae yellow.

Color dull yellow, obscurely clouded with pale gray, head somewhat darker; legs concolorous with body; fore wings yellowish, lightly shaded with gray, darkest at tip; tube bright pale yellow across base and in apical half, remainder orange-yellow; antennae about concolorous with head, but paler in segments I-III. Length about 1.8 mm. (distended, 2.2 mm.); head, total length 0.217, width across eyes 0.172, just behind eyes 0.166, across cheeks 0.181, in front of basal collar 0.153, across collar 0.155; eyes 0.067; postocular setae 0.074, interval 0.148, distance from eyes 0.025; mouth-cone 0.110; prothorax 0.140, width across coxae 0.314, antero-marginal setae 0.010, antero-angular 0.044, midlateral 0.037, epimeral 0.062, postero-marginal 0.054, coxal 0.060; mesothorax, width across anterior angles 0.293, abdomen (at segment II) 0.281; fore wings 0.76; tube 0.130, width near base 0.083, at apex 0.037, terminal setae 0.073; segment IX, seta I 0.174, II 0.151, III 0.130. Antennal segments (μ): I 36 (41), II 54 (34), III 50 (39), IV 43 (39), V 40 (36), VI 40 (33), VII 43 (29), VIII 43 (21).

Brachypterous female with smaller eyes and heavier prothorax.

Male (brachypterous) with reduced eyes, heavy prothorax, and with the postocular and some of the prothoracic setae often longer and pointed.

BRAZIL: Belém, Pará, July 23 and August 5, 1951 (holotype and allotype on latter date), J.D.H., 33 ♀♀ and 6 ♂♂, from dead branches of *Hevea*.

BLEPHARIDOTHRIPS gen. nov.*

Allied to *Hoplothrips*, but with a transverse row of four subequal postocular setae; head long, deeply notched behind the protruding and nearly spherical eyes; third antennal segment shorter than fourth, fifth, and sixth, those beyond III clothed with numerous fine setae (much as in some species of *Polyphemottrips*), VIII with a short pedicel, sense-cones on III-VI (in macropterous individuals, only) nearly or quite as long as the succeeding segment; mouth-cone broadly rounded at tip; pronotum with posterior margin straight; fore tarsi toothed in both sexes; wings not narrowed at middle, with accessory hairs. Type of genus: *Blepharidothrips sphaerops* sp. nov.

13. *Blepharidothrips sphaerops* sp. nov.

Color chestnut-brown, with red internal pigmentation, tube bright yellow in about apical two-thirds, bright orange basally, tipped with gray; legs somewhat paler than body, with trochanters, tarsi, and both ends of tibiae yellow; fore wings dark brown, darkest in anal area, with a darker median streak extending to near middle, and with a pale streak paralleling each margin, in apical half or more, just within bases of

**Blepharon*, eyelash; *thrips*, a wood-worm—in allusion to the increased number of postocular setae.

fringing hairs; antennæ about concolorous with head in segments I and II, darker and more blackish in IV-VIII, apex of II and basal third of III yellow, remainder of III brown; setæ on head, body, and wings brownish yellow. Length about 2.6 mm. (distended, 3.4 mm.); head, total length 0.337, across eyes 0.245, just behind eyes 0.221, across cheeks 0.237, in front of basal collar 0.183, across collar 0.186, width in front of eyes 0.132, its dorsal surface finely reticulate throughout; postocular setæ 65-104 μ , slightly dilated at tip; mouth-cone 0.156; prothorax, median length 0.178, across coxæ 0.423, pronotum striate anteriorly, posteriorly, and laterally, with dark median apodeme, antero-marginal setæ minute (10 μ) and pointed, others with dilated pale tips, antero-angular 0.055, midlateral 0.095, epimeral 0.109, postero-marginal 0.101, coxal 0.086, coxæ with four shorter pointed pairs behind these last; mesothorax, across anterior angles 0.441, metathorax 0.437, abdomen (at segment III or IV) 0.520; fore wings 1.37; tube 0.253, across basal collar 0.106, at tip 0.057, its sides very slightly concave at about basal fourth, very slightly narrowed at tip, terminal setæ 0.247; segment IX, seta I 0.135, II 0.156, III 0.211. Antennal segments (μ): I 73 (57), II 70 (41), III 113 (53), IV 144 (52), V 147 (47), VI 133 (43), VII 112 (37), VIII 87 (27); major sense-cones III 1-2, IV 2-2, V 1-1, VI 1-1, VII 1 dorsal.

Brachypterous female not essentially different in color or structure, save for the very much shorter sense-cones (about 50 μ long).

Male (brachypterous) somewhat paler and more yellowish than female, excepting in segments II-IV of abdomen; prothorax and fore legs enlarged, tarsal tooth straight and longer than width of tarsus.

BRAZIL: Boracéia, Munic. de Salesópolis, S.P., June 29, 1948, Lauro Travossos Filho and Ernesto Rabello, 4 ♀ ♀ (1, the holotype, macropterous) and 2 ♂ ♂, from dry branches.

14. *Malacothrips fasciatus* sp. nov.

The Brazilian equivalent of *M. zonatus* Hinds,* but with much longer head.

Color yellow, with head and abdominal segments II, VI, and VIII-X abruptly blackish brown, X darker basally. Head about 1.5 times as long as wide; antennæ slender; sense-cones on III 1 (2), IV 1 (2).

♀ (macropterous): Length 2.2 mm.; head, length 0.280, width across eyes 0.182, width just behind eyes 0.157, width across cheeks 0.183, width near base 0.169, width in front of eyes 0.099; postocular setæ, length 0.090, interval 0.129; prothorax, median length 0.158, width across coxæ 0.358; antero-marginal setæ 0.057, antero-angulars 0.060, midlaterals 0.065, epimerals and postero-marginals about 0.091, coxals 0.055; tube, length 0.169, greatest width 0.087, apical width 0.045; setæ on segment IX of abdomen, I 0.218, II 0.203, III 0.191. Antennal segments (μ): I 49 (52), II 60 (36), III 79 (35), IV 75 (34), V 73 (30), VI 65 (26), VII 57 (24), VIII 50 (17).

Male very similar to female; fore tarsi with a small tooth near base.

BRAZIL: Nova Teutonia, Santa Catarina, May 15 and 24, 1949, Fritz Plaumann, 9 ♀ ♀ (3 of them macropterous), 2 ♂ ♂ (brachypterous), from grasses.

*Synonym: *Eurythrips flavacinctus* (sic) Moulton and Andre; new synonymy.

15. *Malacothrips mediator* sp. nov.

The Brazilian equivalent of *M. roycei*, but with more slender antennæ and with the apical abdominal segments, rather than the basal ones, pale.

Color blackish brown, with head, abdominal segments V-IX, and basal half of tube, nearly yellow; fore legs yellow; middle and hind legs brown, with tarsi, both ends of tibiæ, and tips of femora, yellow. Head fully 1.2 times as long as wide; antennæ stout; sense-cones on III 1 (1), IV 1 (2).

♀ (brachypterous): Length 1.8 mm.; head, length 0.211, width across eyes 0.158, width just behind eyes 0.150, width across cheeks 0.171, width near base 0.164, width in front of eyes 0.094; postocular setæ, length 0.064, interval 0.134; prothorax, median length 0.154, width across coxæ 0.347; antero-marginal setæ 0.043, antero-angulars 0.054, midlaterals 0.049, epimerals 0.065, postero-marginals 0.072, coxals 0.060; tube, length 0.147, greatest width 0.082, apical width 0.041; setæ on segment IX of abdomen, I 0.104, II 0.112, III 0.110. Antennal segments (μ): I 45 (45), II 53 (36), III 64 (35), IV 59 (35), V 63 (32), VI 51 (27), VII 52 (25), VIII 34 (13).

Male unknown.

BRAZIL: Nova Teutonia, Santa Catarina, May 24, 1949, Fritz Plau-mann, 2 ♀ ♀, from grasses.

16. *Orthothrips leptura* sp. nov.

Readily known by the long, slender, dark tube, the minute postocular and pronotal setæ, and the presence of one sense-cone, only, on either surface of antennal segments III and IV.

Color golden yellow, excepting for the brown thorax and tube; legs yellow; antennæ yellow in segments I, III, IV, and pedicels of V and VI, II brown, IV lightly infusate apically, V shaded with brown beyond pedicel, apical portion of VI and all of VII and VIII dark blackish brown. Length 2.0 mm.; head, total length 0.271, width across eyes 0.172, least width at posterior margin of eyes 0.147, greatest width across cheeks 0.169, least width near base 0.155, length in front of eyes 0.043, width in front of eyes 0.106; eyes, dorsal length 0.075, width 0.049, interval 0.074; postocular setæ, length 0.007, interval 0.121, distance from eyes 0.020; mouth-cone, length beyond posterior dorsal margin of head 0.073; prothorax, median length 0.134, width across coxæ 0.300, epimeral setæ 0.030, all others about 0.010; mesothorax, width across anterior angles 0.329; metathorax, greatest width 0.332, abdomen (at segment III) 0.347; fore wings, length 0.882; tube, length 0.316, subbasal width 0.063, apical width 0.029, terminal setæ 0.097; segment IX, seta I 0.033, II, 0.087, III 0.073. Antennal segments (μ): I 52 (45), II 60 (35), III 71 (33), IV 69 (31), V 69 (30), VI 63 (26), VII 44 (23), VIII 31 (13).

Male like female in color and general structure.

BRAZIL: Belém, Pará, August 9, 1951, J. D. H., 1 ♀, 3 ♂ ♂, from dead leaves of *Astrocaryum mumbaca*.

17. *Hoplandothrips fusciflavus* sp. nov.

Readily known from other pale species of genus by the relatively broad head (about 1.2 times as long as wide), nearly yellow middle

and hind femora (only lightly shaded with brown), nearly smooth pronotum, reticulated mesonotum (often nearly smooth anterior to median pair of setæ), broadly dilated major setæ, and long terminal setæ.

Color brownish yellow, with head, prothorax, sides of pterothorax, and last three abdominal segments brown, head and tube darkest, the latter paler in apical half and across base, tergum II and sides of abdomen more or less shaded, terga II-IV narrowly darkened across extreme base and with anterior angles darkest, III-VII with a dark transverse dash bordering subbasal line behind; internal pigmentation (in most of the dark areas) red; coxæ brown, trochanters nearly colorless, fore femora dark brown in about basal half, shading to pale yellow apically, remainder of legs pale yellow, but with middle and hind femora shaded lightly except at ends; fore wings pale yellow-gray, darkest in second fourth, anal area pale; antennæ brown, but paler than head in segments I, II and IV-VIII, segment III yellow, I paler basally, II paler except at base and narrowly along sides, III sometimes perceptibly clouded apically IV and V (sometimes VI) yellow to first whorl of setæ; postocular and prothoracic setæ light yellowish brown, terminal ones darker, others yellow. Length about 1.8 mm. (distended, 2.4 mm.); head, total length 0.252, across eyes 0.185, across cheeks (opposite posterior dorsal margin of eyes) 0.206, in front of basal collar 0.161, across collar 0.165, length in front of eyes 0.024, width 0.080, with distinct delicate reticulation except in median area posterior to ocelli; eyes 0.095, not protruding posteriorly; postocular setæ 0.078, interval 0.154, distance from eyes 0.018, their tips broadly expanded, minor cephalic setæ short, those on cheeks brownish yellow and arising from distinct tubercles; prothorax 0.140, across coxæ 0.339, surface with a few transverse lines of sculpture along posterior margin, antero-marginal setæ 0.051, antero-angular 0.065, midlateral 0.049, epimeral 0.077, postero-marginal 0.073, coxal 0.045, their tips broadly expanded and about 13 μ across; mesothorax across anterior angles 0.322, metathorax 0.318, abdomen (at segment IV) 0.367; fore wings 0.83, with about 11 accessory hairs; tube 0.130, across basal collar 0.067, at apex 0.034, terminal setæ 0.224; segment IX, seta I (slightly dilated) 0.104, II (nearly pointed) 0.118, III (pointed) 0.171. Antennal segments (μ): I 40 (38), II 53 (31), III (sinuate on inner surface) 73 (37), IV 72 (34), V 63 (27), VI 56 (24), VII 48 (22), VIII (very slightly narrowed and then broadened at extreme base) 33 (12); sense-cones as in allies.

Male bright yellow, with scattered red internal pigmentation, head and abdominal segments IX and X abruptly dark brown, IX yellow basally, X yellowish basally and paler apically, III-VIII with dark median dash, mesothorax with margins narrowly shaded, legs wholly yellow, antennæ as in female; fore legs modified in the usual manner.

BRAZIL: Ilha da Gipoia, R.J., May 25, 1948 (including holotype and allotype), 9 ♀♀, 8 ♂♂.—Jacarepaguá, D.F., May 9-June 28, 1948, J.D.H. and Thomas Borgmeier, 49 ♀♀, 27 ♂♂.—São Carlos, S.P., June 13, 1948, J.D.H., 2 ♂♂. Common on dead branches.

18. *Hoplandrothrips albipes*, sp. nov.

Allied to *uzeli*, but with inner surface of third antennal segment straight, head scarcely 1.2 times as long as wide, length of tube only

slightly more than 0.5 that of head and less than twice its greatest width, this less than twice the apical width.

Color dark blackish brown, usually with a varying number of basal abdominal segments paler, tube paler in apical half and across base, internal pigmentation red; all femora dark blackish brown, tipped with very pale yellow (almost white), all tibiae, tarsi, and trochanters nearly white; fore wings pale yellowish, with a very faint cloud in about second fourth, anal area pale gray and darkest; antennae with segment I blackish brown but paler basally, II brown but yellowish apically, III yellow but very faintly clouded apically, IV-VI yellow to first whorl of setae, their remainders and VII-VIII gray-brown, IV often yellowish in narrowed apical portion; postocular, prothoracic, and terminal setae dark brown, others pale yellowish. Length about 2.2 mm. (distended, 2.9 mm.); head, total length 0.281, across eyes 0.221, across cheeks (opposite posterior dorsal margin of eyes) 0.242, in front of basal collar 0.200, across collar 0.202, length in front of eyes 0.026, width 0.099, sculpture unusually faint and confined to extreme sides, base, and sides of ocellar area; eyes 0.105, not protruding posteriorly; postocular setae 0.096, interval 0.179, distance from eyes 0.018, broadly expanded at tip, minor cephalic setae short, those on cheeks dark brown, conspicuous, arising from small tubercles, the posterior pair largest (about $25\ \mu$); prothorax 0.181, across coxae 0.424, unusually smooth, with a few very faint lines of sculpture along posterior margin, only; antero-marginal setae 0.061, antero-angular 0.086, midlateral 0.098, epimeral 0.081, postero-marginal 0.091, coxal 0.066, their tips broadly expanded; mesothorax across anterior angles 0.407, metathorax 0.381, abdomen (at segment III) 0.571; metanotum sculptured at tip and along sides of elevated area; fore wings 1.0, with about 10 accessory hairs; tube 0.149, across basal collar 0.082, at tip 0.045, terminal setae 0.294; segment IX, seta I (dilated) 0.119, II (dull) 0.133, III (pointed) 0.164. Antennal segments (μ): I 40 (45), II 59 (34), III 81 (43), IV 87 (40), V 74 (32), VI 65 (24), VII 57 (23), VIII (very slightly narrowed and then a trifle broadened at extreme base) 40 (13); sense-cones as in allies.

Male essentially like female in color and structure; antero-angular setae elongated ($100\ \mu$) in large individuals; fore legs modified in the usual manner.

BRAZIL: Jacarepaguá, R.J., May 9-June 27, 1948 (holotype and allotype June 1), J.D.H. and Thomas Borgmeier, 26 ♀♀, 22 ♂♂, from dead branches and leaves.

19. *Hoplandrothrips variegatus* sp. nov.

Very small, slender, yellow, with brown markings and red internal pigmentation; head long; postocular and prothoracic setae short and broadly expanded ($7-10\ \mu$) at tip; pronotum unusual in that its strong and dark transverse sculpture consists of an anterior and a posterior median patch; metanotum sculptured in entire elevated portion, the lines dark and forming longitudinal polygons whose front and hind margins are often incomplete.

Color bright yellow, ornamented with numerous dark gray-brown areas, nearly all of which are underlain with the red pigmentation, the dark dorsal areas disposed as follows: ocellar region and front of head,

cheeks just behind and at sides of eyes, sometimes basal collar of head, at least the sides of prothorax, sides and front of mesothorax, posterior half of mesonotum, anterior portion of metanotal plate, sides of abdominal segments and distal portion of ninth; tube dark brown, yellowish across base and paler in apical half; femora dark brown, tipped with yellow, trochanters, tibiae, and tarsi also yellow; fore wings gray, with tip, middle and basal fourth (excepting anal area) pale; antennae gray-brown in segments I and IV-VIII, II yellowish medially and apically, III yellow but shaded with gray beyond first whorl of setae, IV yellowish to just beyond pedicel; terminal setae gray, others yellow. Length about 1.55 mm. (distended, 1.8 mm.); head, total length 0.238, width across eyes 0.153, across cheeks 0.172, in front of basal collar 0.142, across collar 0.146, length in front of eyes 0.022, width 0.068, with distinct delicate reticulation except in median area posterior to ocelli, the reticles large and more distinct in posterior half of head; eyes 0.073, width 0.053, interval 0.047, not protruding posteriorly; postocular setae 0.048, interval 0.108, distance from eyes 0.022; minor cephalic setae short, pale, arising from insignificant tubercles; prothorax 0.140, across coxae 0.266, epimeral seta 0.044, coxal 0.027, antero-marginal and others 0.030-0.041; mesothorax across anterior angles 0.260, meta-thorax 0.265, abdomen (at segment II) 0.267; fore wings 0.73, with about 5 accessory hairs; tube 0.120, across basal collar 0.060, at apex 0.032, terminal setae 0.133; segment IX, seta I (slightly dilated at tip) 0.082, II and III (pointed) 0.094 and 0.113, respectively. Antennal segments (μ): I 34 (34), II 49 (27), III 63 (32), IV 57 (32), V 49 (27), VI 47 (23), VII 40 (22), VIII (with short and slightly flared pedicel) 33 (14); sense-cones as in allies.

Male (macropterous) much like female but with prothorax and abdominal segments III-VIII not darkened laterally, all femora nearly yellow, pronotum without sculpture except posteriorly; fore legs modified in the usual manner.

BRAZIL: Boracéia, Munic. de Salesópolis, S.P., June 6, 7, and 8, 1948 (holotype and allotype June 8), 18 ♀♀, 9 ♂♂.—Jacarepaguá, D.F., May 9, 1948, J.D.H. and Thomas Borgmeier, 1 ♀. All specimens came from dead branches.

20. *Hoplandrothrips ommatus* sp. nov.

Allied to *affinis*, but with head about 1.8 times the width across eyes, segment III of antennae scarcely 1.5 times as long as wide, tergum II of abdomen with one knobbed seta at each posterior angle, and III with two.

Color dark blackish brown, with red internal pigmentation, tube paler across base and in about apical two-thirds; tibiae much paler than femora, yellowish, shaded with brown, their apices and all tarsi yellow; fore wings nearly colorless, anal area shaded with brown; antennae with segments I and II blackish brown and darkest, III with pedicel pale yellow, its remainder gray-brown and heavily shaded with black along inner surface, IV-VI paler and with at least pedicels dull yellow, their apical portions and all of VII and VIII gray-brown; terminal setae brown, all others pale, becoming yellow on the apical segments of abdomen. Length about 1.7 mm. (distended, 2.1 mm.); head, total length

0.256, width across eyes 0.145, at posterior angles of eyes 0.137, across cheeks (at middle) 0.164, near base 0.152, length (and width) in front of eyes 0.029 (0.080), dorsal surface sculptured at sides, basally, and at eyes; eyes 0.080, protruding posteriorly; postocular setæ 0.068, interval 0.125, distance from eyes 0.021, dilated and divided at tip; minor cephalic setæ small, about four pairs arising from small tubercles on profile of cheeks; prothorax 0.147, across coxae 0.274, almost without sculpture; antero-marginal setæ about 0.016 and pointed, others dilated like postoculars, antero-angular 0.037, midlateral 0.040, epimeral and postero-marginal about 0.055, coxal 0.043; mesothorax across anterior angles 0.302, metathorax 0.276, abdomen (at segment IV) 0.323; elevated portion of metanotum faintly sculptured with pale longitudinal striæ along sides and at tip; fore wings 0.714, with about six accessory hairs; tube 0.135, across basal collar 0.074, at tip 0.039, sides straight, terminal setæ 0.177; segment IX, all setae pointed, I 0.146, II 0.167, III 0.153. Antennal segments (μ): I 36 (37), II 53 (31), III 58 (40), IV 61 (37), V 56 (30), VI 48 (24), VII 47 (23), VIII (slightly narrowed basally) 34 (13); sense-cones as in allies.

Male (macropterous) essentially like female in color and structure; fore legs modified in the usual manner.

BRAZIL: Jacarepaguá, D.F., May 15-19, 1948 (holotype and allotype May 18), J.D.H., 6 ♀ ♀, 3 ♂ ♂, from grasses and a sedge.

21. *Neurothrips frontalis* sp. nov.

Allied to *allopterus* through lack of dorsal furrow and flattened wing-retaining setæ in abdominal tergum VIII, but with fore femora and tarsi not toothed, fore wings without accessory hairs, tube three times as long as wide, head with front and lateral margins narrowly white, first antennal segment white, its outer surface blackish brown.

Coloration typical, pale as in *williamsi*. Length 2.5 mm. (distended, 2.9 mm.); head, total length 0.337, width across eyes 0.234, across cheeks (exclusive of tubercles) 0.287, near base 0.232, across basal collar 0.234; eyes, dorsal length 0.168; postocular setæ 0.021, interval 0.061, distance from eyes 0.017; prothorax, median length 0.213, width across coxae (exclusive of tubercles) 0.458, antero-marginal setæ 0.021, antero-angular 0.033, midlateral 0.028, epimeral 0.041, coxal 0.040, postero-marginal 0.022; mesothorax, width across anterior angles 0.456; metathorax, greatest width 0.458, abdomen (at segment III) 0.469; fore wings 1.18; tube, length 0.224, subbasal width 0.075, apical width 0.053, terminal setæ 0.770; segment IX, seta I 0.053, II 0.047, III 0.120. Antennal segments (μ): I 51 (46), II 64 (37), III 121 (39), IV 102 (37), V 90 (34), VI 59 (29), VII 54 (25), VIII 34 (14).

Male not essentially different from female.

BRAZIL: Boracéia, Munic. de Salesópolis, S.P., June 5, 1948, J.D.H., 1 ♀, 4 ♂ ♂, from dead branches.

22. *Arcyothrips brasiliensis* sp. nov.

Much like type of genus, but with head 1.3 times as long as wide, roundly produced between eyes and overhanging frontal costa and first antennal segment, the antennal segments longer and much more slender,

IV-VI not globose beyond pedicels, III with a sense-cone on outer surface.

Color blackish brown; membrane between head and prothorax, and a small median spot at front of mesonotum and one at rear of metanotum, chalky white; internal pigmentation red; legs nearly concolorous with body, tarsi and both ends of tibiae yellowish; antennae with segments II and III brownish yellow, their remainder blackish brown; sculpture almost as in type of genus, but with reticulation of pronotum less polygonal. Length about 1.5 mm. (distended, 1.8 mm.); head, total length 0.234, across eyes 0.159, across cheeks 0.181, in front of basal collar 0.165, across basal collar 0.168; eyes 0.057, width 0.044, interval 0.071; postocular setae 0.016, interval 0.115, distance from eyes 0.012; mouth-cone 0.153; prothorax 0.143, across coxae 0.322, epimeral setae 0.033, midlateral and coxal 0.018, others 0.021-0.023, all dilated at tip; mesothorax across anterior angles 0.302, metathorax 0.311, abdomen (at segment III) 0.316; fore wings 0.71; tube 0.163, subbasal width 0.062, at tip 0.029, terminal setae 0.170; segment IX, seta I 0.050, II 0.127, III 0.096. Antennal segments (μ): I 33 (24), II 56 (30), III 46 (27), IV 49 (30), V 44 (29), VI 43 (24), VII 67 (21).

Brachypterous female with head 1.4 times as long as wide.

BRAZIL: São Carlos, S.P., June 13, 1948, J.D.H., 2 brachypterous ♀♀, from dead branches.—Nova Teutonia, S.C., Dec., 1951, Fritz Plaumann, 32 macropterous ♀♀ (including holotype), from dead branches.

23. *Diceratothrips cornutus* sp. nov.

Like *robustus*, only, in having frontal setae attaining or surpassing tip of antennal segment II, but with tube short, stout, and with straight sides, and abdominal setae very long; male with enlarged setae on inner surface of fore femora not grouped at base and not triangular, fore tibiae with three or four prominent setigerous tubercles on inner surface.

Color nearly black, with articulations of legs somewhat paler, second antennal segment brown but darkened on inner surface and yellow at tip, third with extreme base of pedicel yellow. Length about 3.9 mm. (distended, 4.7 mm.); head, total length 0.521, width across eyes 0.321, just behind eyes 0.314, across cheeks at anterior third 0.326, in front of basal collar 0.295, across basal collar 0.307; postocular setae 0.222, interval 0.154; frontal setae about 0.154 (arising from prominent tubercles), interval 0.112, diameter 0.013; postocellar setae stout, blunt, attaining front margin of eyes; prothorax, median length 0.251, width across coxae 0.714; epimeral setae 0.196, midlaterals about 0.008, all others 0.057-0.065; mesothorax, width across anterior angles 0.672; fore wings 1.7; abdomen, greatest width (at segment IV) 0.717; tube, length 0.472, width near base 0.202, at apex 0.069, terminal setae 0.266; segment IX, seta I 0.588, II 0.630, III 0.561. Antennal segments (μ): I (exposed length) 67 (63), II 104 (50), III 241 (53), IV 185 (50), V 137 (46), VI 104 (43), VII 95 (36), VIII 44 (21)—the lengths exclusive of ventral prolongations.

Male like female in color; longest fore tibial tubercle about 27 μ ;

head 477 μ , tube 406, width at base 168, at tip 64, sides straight, tip very slightly constricted; setae on IX about 567 μ .

BRAZIL: Belém, Pará, July 30 (holotype) and July 25 (allotype), 1951, J.D.H., 1 ♀ from tall grass in open field, 1 ♂ from dead cashew branch.

24. *Adelothrips palmarum* sp. nov.

Apparently a true member of the genus,* but unique in that the last two antennal segments are not at all united, and seta II on segment IX of abdomen is knobbed.

Color reddish brown or reddish yellow, due in part to abundant bright red internal pigmentation, the integument itself brownish yellow, the head shaded with darker along sides, abdomen often darkened in segment VII and VIII; tube pale yellow in apical fourth and across base, orange between, sometimes tipped with gray; femora brownish yellow, tibiae and tarsi yellow, darker (older) individuals with all tibiae darkened except at ends; antennae brownish gray, more yellowish in the first two segments, the third pale yellow basally; fore wings yellowish gray, somewhat paler at subbasal setae and again shortly beyond middle; all major setae yellow, those on head and prothorax more brownish. Length about 1.9 mm. (distended, 2.3 mm.); head, total length 0.263, width at posterior profile of eyes 0.175, across eyes 0.178, across the nearly parallel cheeks (at about anterior third) 0.200, in front of weak basal collar 0.190, across collar 0.192, faintly sculptured basally, laterally, and in ocellar area; eyes 0.087; postocular setae 0.081, dilated and divided at tip, 0.130 apart and 0.012 from eyes; mouth-cone 0.137, broadly rounded at tip; prothorax 0.167, across coxae 0.378, faintly sculptured posteriorly, its setae like postoculars, antero-marginal 0.048, antero-angular 0.072, midlateral 0.065, epimeral 0.071, postero-marginal 0.065, coxal 0.052; mesothorax across anterior angles 0.351, metathorax 0.336, abdomen (at segment IV) 0.388; median tergite of segment I with two pores; fore wings 0.805, with about 7 accessory hairs; tube 0.133, across basal collar 0.083, at apex 0.044, its sides thickened and slightly concave between the two pairs of pores; terminal setae 0.231; segment IX, seta I (dilated) 0.093, II (dilated) 0.093, III (pointed) 0.171. Antennal segments (μ): I 42 (44), II 56 (33), III 66 (36), IV 69 (33), V 63 (30), VI 54 (25), VII 48 (22), VIII (very slightly narrowed basally) 40 (14).

Male (macropterous) essentially like female in color and structure, but with fore legs enlarged and tarsal tooth stronger.

BRAZIL: Belém, Pará, August 9-19, 1951 (holotype and allotype on latter date), J.D.H., 18 ♀♀, 14 ♂♂, from *Euterpe* and *Astrocaryum*.

25. *Adelothrips graminicola* sp. nov.

Allied closely to type of genus, but with tube 0.7 the length of head, somewhat constricted at tip, and markedly thickened, and with pedicel of segment VII of antennae flared outward at base.

Color yellow, with red internal pigmentation in head, thorax, and along

*To this genus belong also the following: (1) *Adelothrips junctus* (Hood), comb. nov.; synonym, *Holothrips quercus* Moulton and Andre, new synonymy. (2) *Adelothrips bratleyi* (Watson), comb. nov.; synonym, *Hoplothrips flavus* Moulton and Andre, new synonymy.

sides of abdomen; head and thorax not shaded, abdomen lightly so in about segments VII-IX, the tube orange, paler across base and just before its gray tip; legs clear yellow; fore wings pale yellowish, gray in basal part of anal area, without cloud at middle; antennæ yellow in first three segments and to near middle of IV, III lightly shaded at apex, remainder of antenna brown except basal two-fifths of V, which is mostly yellow, VII+VIII darkest, pedicel of VII nearly black; terminal setæ dark gray, all others yellow. Length 2.5 mm. (distended, 3.1 mm.); head, total length 0.336, across eyes 0.210, at posterior angles of eyes 0.207, across cheeks at about anterior third 0.224, in front of basal collar 0.199, across collar 0.206, length in front of eyes 0.043, width 0.118, cheeks evenly rounded, dorsal surface with faint reticulation posterior to postocular setæ except medially; eyes 0.074; postocular setæ (dilated) 0.106, interval 0.178, distance from eyes 0.046; minor cephalic setæ short, slender, pale, very inconspicuous; prothorax 0.193, across coxæ 0.413, smooth excepting for a few faint striæ along posterior margin, setæ dilated at tip, antero-marginal 0.050, antero-angular 0.062, midlateral 0.085, epimeral 0.110, postero-marginal 0.095, coxal 0.106; mesothorax across anterior angles 0.374, metathorax 0.360, abdomen (at segment IV) 0.447; fore wings 0.95, with 4-6 accessory hairs; tube 0.238, across base 0.103, at apex 0.046; terminal setæ 0.266; segment IX with setæ pointed, I 0.277, II 0.266, III 0.217. Antennal segments (μ): I 63 (56), II 76 (41), III 93 (42), IV 93 (42), V 86 (37), VI 77 (35), VII+VIII 97 (31), the suture between the last two represented only by a short ventral dash.

Male (brachypterous) like female in color and essential structure; fore legs enlarged, tarsal tooth stronger.

BRAZIL: Jacarepaguá, D.F., May 15-June 21, 1948 (holotype June 1, allotype May 15), J.D.H. and Thomaz Borgmeier, 3 ♀♀ and 7 ♂♂, from *Andropogon* and other grasses.

26. *Adelothrips formosus* sp. nov.

Resembling only *umbricola* in pale color, absence of pores from median tergite of first abdominal segment, and knobbed seta I on abdominal segment IX, but with head only 1.4 times as long as greatest width, cheeks convex, minor setæ on head short and inconspicuous, tube thick-walled and constricted at tip.

Color bright golden yellow, with bright red internal pigmentation, head shaded with gray between eyes, mesothorax and sides of second abdominal segment likewise darkened; tube brownish orange, tipped with gray, narrowly paler across base and just before darkened tip; legs yellow, middle and hind femora (especially the latter) shaded with gray; fore wings pale yellowish gray, darkest in anal area, with a distinct gray cloud near middle; antennæ bright yellow in first four segments and usually in basal half of V and pedicel of VI, remainder brown or blackish brown; terminal setæ yellowish gray, all others yellow. Length about 2.6 mm. (distended, 3.3 mm.); head, total length 0.370, across eyes 0.262, just behind eyes 0.270, in front of basal collar 0.218, across collar 0.227, length in front of eyes 0.037, width 0.128, cheeks rounded, dorsal surface with faint reticulation posterior to postocular setæ except medially; eyes 0.096; postocular setæ 0.105, interval 0.209,

distance from eyes 0.033; longest genal setæ 0.020, dorso-cephalic setæ 0.035; prothorax 0.218, across coxæ 0.463, smooth excepting for a few faint striae near posterior margin, setæ dilated at tip, the two anterior pairs 0.068-0.070, midlateral 0.097, epimeral 0.108, postero-marginal 0.089, coxal 0.072; mesothorax across anterior angles 0.403, abdomen (at segment V) 0.452; fore wings 1.06, with about 8 accessory hairs; tube 0.251, across base 0.107, at tip 0.048; terminal setæ 0.294; segment IX, seta I (knobbed) 0.155, II (pointed) 0.224, III (pointed) 0.207. Antennal segments (μ): I 61 (55), II 80 (39), III 103 (40), IV 97 (40), V 82 (36), VI 75 (33), VII 58 (28), VIII 37 (19) and conical, firmly joined to VII but with suture complete.

Male (brachypterous or macropterous) like female in color and essential structure; fore legs enlarged, tarsal tooth stronger.

BRAZIL: Jacarepaguá, D.F., May 12-June 22, 1948 (holotype and allotype June 20), J.D.H. and Thomaz Borgmeier, 13 ♀♀, 5 ♂♂.—Angra dos Reis, R.J., May 24, 1948, J.D.H., 2 ♀♀, 1 ♂.—Ilha da Gipoia, R.J., May 25, 1948, J.D.H., 5 ♀♀, 1 ♂. Common on dead branches.

27. *Adelothrips umbricola* sp. nov.

Resembling only *formosus* in pale color, absence of pores from median tergite of first abdominal segment, and knobbed seta I on ninth abdominal segment, but differing importantly in the longer head, nearly straight cheeks, longer genal setæ, longer setæ on dorsum of head, and the thin-walled tube not constricted at tip.

Color yellow, with red internal pigmentation, head shaded across front and at sides opposite eyes, mesothorax and some of the abdominal segments beyond I lightly shaded; tube yellow, tipped with gray, pale in apical half, golden basally; legs yellow, femora often shaded; fore wings pale yellowish gray, darkest in anal area, clouded at middle; antennæ yellowish brown, about concolorous with head, darkest in last four or five segments, I shaded with gray, II and III nearly yellow; terminal setæ yellow-gray, others yellow. Length about 1.9 mm. (distended, 2.5 mm.); head, total length 0.336, across eyes 0.217, at posterior angles of eyes 0.216, across cheeks just behind eyes 0.224, in front of basal collar 0.192, across collar 0.200, the cheeks nearly straight though slightly concave about opposite postocular setæ and again near base, dorsal surface virtually without sculpture; eyes 0.077, width 0.067, interval 0.083; postocular setæ 0.090, dilated at tip, 0.151 apart, 0.025 from eyes; minor cephalic setæ long and slender, those on cheeks 0.030, dorso-cephalic 0.058, postocellars surpassing front margin of ocelli; prothorax 0.153, across coxæ 0.346, smooth excepting for a few faint striae near posterior margin, setæ dilated and divided at tip, the three anterior pairs 0.061-0.068, epimeral 0.098, postero-marginal 0.092, coxal 0.048; mesothorax across anterior angles 0.335, abdomen (at segment IV) 0.374; fore wings 0.96, with 5-9 accessory hairs; tube 0.188, across base 0.079, at the slightly narrowed but not constricted tip 0.040, its sides not thickened; terminal setæ 0.224; segment IX, seta I (knobbed) 0.113, II and III (pointed) 0.168. Antennal segments (μ): I 53 (46), II 73 (36), III 90 (40), IV 90 (42), V 76 (37), VI 70 (34), VII 54 (29), VIII 39 (21) and conical, firmly joined to VII but with suture complete.

Male (brachypterous) like female in color and essential structure, but more yellowish; fore legs enlarged, tarsal tooth stronger.

BRAZIL: Boracéia, Munic. de Salesópolis, S.P., June 5, 1948, 2 ♀♀ and 1 ♂ (including holotype and allotype), from dead branches in dense wet jungle.—Petrópolis, R.J., May 11 and 12, 1948, J.D.H., 1 ♀ and 4 ♂♂, from dead branches in shade.

28. *Holothrips procerus* sp. nov.

Very different from type of genus in that the wing-retaining setæ on abdominal terga II-V are arcuate, instead of sigmoid, and the first two antennal segments are about concolorous with head, rather than with the third segment; head 1.7 times as long as greatest width; tube slightly longer than head, constricted apically, its sides not ridged or roughened; postocular setæ very short, straight; frontal costa flat.

Color of head, thorax, abdomen, and tube blackish brown; fore tarsi yellowish; antennal segments I and II concolorous with head, II pale subapically, III yellowish brown, palest and more yellow basally, lightly shaded to beyond middle, remainder of antennæ dark brown, IV and V blackish basally. Length 4.9 mm. (distended, 6.0 mm.); head, total length 0.589, width across eyes 0.339, just behind eyes 0.332, across cheeks at middle 0.349, near base 0.322, across basal collar 0.343; eyes, dorsal length 0.151; postocular setæ 0.051, interval 0.238, distance from eyes 0.104; mouth-cone 0.288; prothorax, median length 0.360, width across coxæ 0.795, antero-marginal setæ 0.054, antero-angular 0.051, midlateral 0.080, epimeral 0.107, postero-marginal 0.169, coxal 0.098; mesothorax, width across anterior angles 0.783; metathorax, greatest width 0.841, abdomen (at segment III) 0.850; fore wings 2.2, with 40-50 accessory hairs; tube, length 0.595, basal width (across collar) 0.207, at apex 0.083, terminal setæ 0.409; segment IX, seta I 0.483, II 0.430, III 0.396. Antennal segments (μ): I 117 (99), II 130 (62), III 225 (71), IV 209 (70), V 181 (58), VI 151 (51), VII+VIII 168 (43).

Male not markedly different from female in color and structure.

BRAZIL: Boracéia, Munic. de Salesópolis, S.P., June 6 (allotype) and 9, 1948, J.D.H., 4 ♀♀ and 1 ♂; and October 10, 1948 (holotype), Lauro Travassos Filho, 1 ♀ and 1 ♂; all from dead branches.

29. *Holothrips amplus* sp. nov.

Very different from type of genus in that the wing-retaining setæ on abdominal terga II-V are arcuate, rather than sigmoid, and the first two antennal segments are about concolorous with head, rather than with the third segment; head less than 1.5 times as long as greatest width; tube longer than head, constricted apically, its sides not ridged or roughened; postocular setæ shorter than eyes; frontal costa concave.

Color of head, thorax, abdomen, and tube blackish brown; antennal segments I and II concolorous with head, II pale subapically, III yellowish brown, palest and more yellow basally, lightly shaded to middle, remainder of antennæ dark brown, IV and V blackish basally, IV with a large pale area at middle and beyond. Length 4.5 mm. (distended, 5.6 mm.); head, total length 0.553, width across eyes 0.374, just behind eyes 0.365, across cheeks at middle 0.379, near base 0.344, across basal collar 0.371; eyes, dorsal length 0.143, width 0.097, interval

0.181, ventral length 0.129, width 0.090, interval 0.195; postocular setæ 0.127, interval 0.260, distance from eyes 0.076; mouth-cone 0.309; prothorax, median length 0.351, width across coxæ 0.829, antero-marginal setæ 0.058, antero-angular 0.069, midlateral 0.138, epimeral 0.167, postero-marginal 0.214, coxal 0.113; mesothorax, width across anterior angles 0.801; metathorax, greatest width 0.872, abdomen (at segment III) 0.899; fore wings 2.11, with 40-50 accessory hairs; tube, length 0.599, basal width (across collar) 0.196, at apex 0.077; terminal setæ 0.354; segment IX, seta I 0.459, II 0.383, III 0.355. Antennal segments (μ): I 117 (92), II 134 (64), III 193 (70), IV 172 (69), V 100 (61), VI 133 (51), VII 103 (41), VIII 55 (31).

BRAZIL: Nova Teutonia, Santa Catarina, December 31, 1948, Fritz Plaumann, 3 ♀♀, from dry branches.

30. *Holothrips aspericauda* sp. nov.

Very different from type of genus in that the wing-retaining setæ on abdominal terga II-V are arcuate, instead of sigmoid, and the first two antennal segments are about concolorous with head, rather than with the third segment; unique in that the tube has several thin ridges or flanges at sides, bearing minute setigerous asperæ.

Color blackish brown, tube orange-brown at sides, fore tarsi brownish yellow; antennæ about concolorous with body, with apex of segment II and basal half of III yellow. Length about 3.2 mm. (distended, 3.9 mm.); head, total length 0.448, width across eyes 0.290, just behind eyes 0.280, across cheeks (at distal third) 0.293, near base 0.262, across basal collar 0.276; eyes, dorsal length 0.121, width 0.082, interval 0.126, ventral length 0.110, width 0.070, interval 0.150; postocular setæ 0.180, interval 0.217, distance from eyes 0.056; mouth-cone 0.216; prothorax, median length 0.265, width across coxæ 0.574, antero-marginal setæ 0.025, antero-angular 0.052, midlateral 0.053, epimeral 0.160, postero-marginal 0.110 coxal 0.079; mesothorax, width across anterior angles 0.571; metathorax, greatest width 0.601, abdomen (at segment IV) 0.667; fore wings 1.6, with 27-30 accessory hairs; tube, length 0.421, basal width 0.157, apical width 0.062, terminal setæ 0.336; segment IX, seta I 0.406, II 0.386, III 0.345. Antennal segments (μ): I 91 (71), II 116 (48), III 160 (54), IV 153 (53), V 130 (48), VI 113 (44), VII+VIII 117 (37).

BRAZIL: Boracéia, Munic. de Salesópolis, S.P., June 5, 7, and 8 (holotype), 1948, J.D.H., 5 ♀♀, from dead branches.

31. *Diplacothrips piceus* sp. nov.

Like type of genus, with frontal costa deeply grooved, frontal setæ large, fore margin of pronotum thickened, etc., but smaller, with antennæ black, and midlateral setæ small.

Color of body, legs, and antennæ piceous-black, the last obscurely yellowish in apex of segment II and extreme base of III; fore wings (when present) with about 34 accessory hairs. Length about 3.6 mm. (distended, 4.6 mm.); head, total length 0.518, width across eyes 0.311, just behind eyes 0.311, at about anterior third of cheeks 0.301, near base 0.305, in front of basal collar 0.276, across basal collar 0.288,

median length in front of eyes 0.021, width in front of eyes 0.183, depth of frontal costa 0.021; eyes, dorsal length 0.118, width 0.089, interval 0.154, ventral length 0.095; interval between posterior ocelli 0.118; postocular setæ 0.340, interval 0.167, distance from eyes 0.030; frontal setæ 0.210, interval 0.114; pronotum, median length 0.174, width across coxæ 0.624; antero-marginal and antero-angular setæ 0.010-0.019, midlateral 0.026, epimerals 0.280, postero-marginals 0.136, coxals 0.050; mesothorax, width across anterior angles 0.602; abdomen, greatest width (at segment III) 0.729; fore wings 1.8, greatest subbasal width 0.174, at basal fourth 0.158, near apex 0.200; tube, length 0.420, subbasal width 0.249, apical width 0.062, terminal setæ 0.203; segment IX, seta I 0.605, II 0.658, III 0.616. Antennal segments (μ): I 107 (69), II 108 (51), III 192 (50), IV 171 (50), V 154 (46), VI 120 (40), VII 86 (35), VIII 75 (26).

Male very similar to female.

BRAZIL: Belém, Pará, July 23 (holotype and allotype) and 26, 1951, J.D.H., 2 ♀ ♀ (one macropterous), 1 ♂, from dead branches.

32. *Gastrothrips firmus* sp. nov.

Large, heavy, with two sense-cones on third antennal segment and four on fourth, head decidedly broadest across eyes and 1.5 times as long as wide, third antennal segment (126-133 μ) about three times as long as wide; fore tarsi with a stout tooth; tube narrowed, but scarcely constricted, at tip; setæ pointed, brown with paler tips, excepting the terminal ones (which are nearly black) and the lowermost series on abdomen, as well as those on IX, these all being more yellowish.

Color nearly black throughout, knees and fore tarsi somewhat yellowish; antennæ largely black, segment II brown in apical three-fifths excepting along inner surface, III bright yellow in about basal ninth and with a yellowish area on outer surface near apex, nearly black at apex and along inner surface, remainder dark brown shaded with dark gray; fore wings pale brown, darker apically, narrowly darkened marginally and in a median streak before middle, anal area darkest, about 20 accessory hairs. Length about 2.8 mm. (distended, 3.3 mm.); head, total length 0.395, across eyes 0.262, just behind eyes 0.246, across cheeks 0.253, near base 0.224, across basal collar 0.231, length beyond eyes 0.032, width 0.130; eyes, length 0.100, width 0.073, interval 0.117; postocular setæ 0.133, interval 0.148, distance from eyes 0.018; mouth-cone 0.134; prothorax 0.154, across coxæ 0.490, epimeral seta 0.102, postero-marginal 0.029, coxal 0.033, others 0.015-0.018; mesothorax, width across anterior angles 0.483, metathorax 0.476, abdomen (at segment V) 0.571; fore wings 1.23, with 18-21 accessory hairs; tube 0.342, across base 0.144, at apex 0.056, terminal setæ 0.283; segment IX, seta I 0.407, II 0.434, III 0.323. Antennal segments (μ): I 59 (54), II 86 (44), III 133 (40), IV 123 (43), V 107 (41), VI 87 (37), VII 59 (30), VIII 43 (17).

Male like female in color and general structure.

BRAZIL: Itanhaen, S.P., June 17, 1948, J.D.H. and John Lane, 3 ♀ ♀, 2 ♂ ♂, from dead branches.

33. *Gastrothrips** *fumipennis* sp. nov.

Very close to *abditus*** but with head about 1.2 times as long as greatest width, its lateral length in front of eyes about 14μ (instead of 7μ), setae on cheeks pale and indistinct, front margin of eyes not protruding, fore wings brown and darkest basally, with a postmedian dark streak in basal half and without accessory hairs, fore femora of male without a group of hooked setae on outer surface at base.

Color dark blackish brown, tube slightly paler basally; fore tarsi and apices of all femora yellow, fore tibiae paler than the others and, like them, paler at either end; antennae blackish brown or black in segments I and IV-VIII, segment II yellowish apically, III pale yellow in pedicel, its remainder blackish brown or with apical half (excepting sides) somewhat paler. Length 2.0 mm. (distended, 2.5 mm.); head, total length 0.252, width across eyes 0.209, just behind eyes 0.204, across cheeks 0.210, in front of basal collar 0.179, across basal collar 0.182, length in front of eyes 0.036, width 0.107, distance between eyes along front margin of head 0.123; eyes 0.086; postocular setae 0.083, interval 0.157, distance from eyes 0.017; mouth-cone 0.095; prothorax 0.133, across coxae 0.339, antero-marginal setae 0.010, epimeral 0.098, postero-marginal 0.086-0.102, others (including coxal) 0.038-0.040; mesothorax across anterior angles 0.347, metathorax 0.350, abdomen (at segment V) 0.420; fore wings 0.95; tube 0.224, subbasal width 0.098, at apex 0.043, terminal setae 0.137; segment IX, seta I 0.199, II 0.221, III 0.232. Antennal segments (μ): I 43 (44), II 66 (37), III 72 (33), IV 58 (34), V 66 (34), VI 63 (32), VII 46 (26), VIII 38 (13).

Male with lateral mesothoracic process (as in *abditus*) in heterogonic major forms.

BRAZIL: Nova Teutonia, S.C., May 16 (holotype and allotype) and Feb., 1949, Fritz Plaumann, 2 ♀♀ and 6 ♂♂, from dry branches.

34. *Symphiothrips caliginosus* sp. nov.

Known from type of genus (possibly its only congener) by dark blackish brown color, absence of accessory wing hairs, and much longer tube.

Color blackish brown, somewhat paler medially in basal abdominal segments, and with a pair of very obscure darker blotches near bases of abdominal terga III-VIII; tube brownish orange, darkened apically; legs concolorous with body; antennae concolorous with head in segments I and II, yellow in III; IV-VII + VIII successively darker and less yellowish, IV shading gradually from yellow to brown, V and VI yellow in pedicel only; fore wings nearly colorless, yellowish basally; setae of head, thorax, and basal abdominal segments nearly colorless, broadly knobbed, those on apical segments yellow, only the two lower pairs on IX and the terminal ones pointed. Length 2.1 mm. (distended, 2.6 mm); head, total length 0.252, width across eyes 0.195, across cheeks 0.217, near base 0.192, across basal collar 0.195; eyes, dorsal length 0.064, width 0.050, interval 0.096, ventral length 0.069, width 0.038, interval 0.119; postocular setae 0.083, interval 0.143, distance from eyes 0.010;

*Synonym: *Probolothrips* Moulton; new synonymy.

**Synonyms: *Probolothrips hambletoni* Moulton and *Hoplothrips brasiliensis* Moulton; new synonymy. (Both species were described from material taken (1) in Minas Gerais, Brazil, (2) by Edson J. Hambleton, (3) in 1933, (4) on dead twigs of Mandioca.)

prothorax, median length 0.181, width across coxæ 0.382, antero-marginal setæ 0.044, antero-angular 0.062, midlateral 0.067, epimeral 0.077, postero-marginal 0.067, coxal 0.048; mesothorax, width across anterior angles 0.364, metathorax, greatest width 0.378, abdomen (at segment V) 0.435; tube, length 0.259, basal width 0.118, apical 0.042, terminal setæ 0.175; segment IX, seta I (knobbed) 0.168, II (pointed) 0.234, III (pointed) 0.301. Antennal segments (μ): I 47 (47), II 67 (37), III 80 (36), IV 72 (41), V 65 (40), VI 53 (36), VII + VIII 71 (33).

BRAZIL: Nova Teutonia, Santa Catarina, January 13, 1949, Fritz Plaumann, 3 ♀ ♀, from dry branches.

35. *Pygothrips longiceps* sp. nov.

Like *fortis* in color and long head, but with postocellar setæ minute; like *zeteki* in last character, but with tube much longer than wide.

Color nearly black, darker in head and last four or five abdominal segments; tube unicolorous, blackish brown; legs brown, with fore tarsi and tips of all femora yellowish; antennæ with segments III-VIII nearly black, extreme base of III, and all of I and II, yellowish shaded with brown; fore wings brownish gray, darker basally, with a post-median dark streak in middle, palest just in front of streak. Head 1.5 times as long as greatest width, cheeks almost straight and parallel; postocellar setæ minute; pronotum not thickened medially; fore tarsi strongly toothed; wings without accessory hairs; tube tapering to apical third, rounded to the constricted tip, with sharp setigerous tubercles. Length 2 mm. (distended, 2.33 mm.); head, total length 0.363, width across eyes 0.223, across cheeks 0.237, least width near base 0.223, length in front of eyes 0.020, width in front of eyes 0.098; eyes, dorsal length 0.089, width 0.066, interval 0.090; postocular setæ 0.134, interval 0.195, distance from eyes 0.034; prothorax, median length 0.130, width across coxæ 0.392, antero-marginal setæ 0.043, antero-angular 0.057, midlateral 0.047, epimeral 0.127, postero-marginal 0.100, coxal 0.075; mesothorax, width across anterior angles 0.392; metathorax, greatest width 0.406, abdomen (at segment V) 0.505; tube, length 0.267, subbasal width 0.182, apical width 0.041, terminal setæ 0.070; segment IX, seta I 0.371, II 0.368, III 0.314. Antennal segments (μ): I 50 (44), II 75 (37), III 89 (34), IV 78 (37), V 76 (37), VI 60 (32), VII + VIII 85 (30).

BRAZIL: Campo Grande, D. F., June 28, 1948, J. D. H., 1 ♀, from miscellaneous grasses in orange orchard on hill.

36. *Pygothrips callipygus* sp. nov.

Like *longiceps* in long head, short postocellar setæ, and long tube, but with the last bright orange, tipped with black, and with its numerous tubercles each bearing a pale seta about 50 μ long, the setæ bent abruptly backwards; third antennal segment yellow, shaded with brown apically.

Color blackish brown, darkest in head and abdominal segments VI-IX; legs about concolorous with body, all tarsi, fore tibiae, bases and tips of middle and hind tibiae, yellowish; antennæ pale yellowish brown in segment I, its apex and all of II yellow; III yellow, shading to brown at apex; IV-VIII dark brown, somewhat blackish, not paler basally, but IV slightly paler just beyond pedicel; fore wings brownish

gray, clouded apically, darkest basally, with a post-median dark streak in middle, palest just in front of streak. Head about 1.4 times as long as greatest width, which is across cheeks, the latter nearly straight, diverging to behind middle; eyes not attaining lateral margins of head, the re-entrant angle formed by cheeks curved forward well onto front of head; postocellar setæ minute; pronotum short, not thickened medially; fore tarsi strongly toothed; wings without accessory hairs; tube tapering somewhat roundly to constricted tip. Length 1.7 mm. (distended, 2.2 mm.); head, total length 0.269, width across eyes 0.167, width of head at eyes 0.180, greatest width across cheeks 0.190, least width near base 0.176, width across basal collar 0.185, length in front of eyes 0.022, width in front of eyes 0.083; eyes, dorsal length 0.072; postocellar setæ 0.087, interval 0.120, distance from eyes 0.008; mouth-cone, length beyond posterior dorsal margin of head 0.130; prothorax, median length 0.113, width across coxæ 0.370, antero-marginal setæ 0.057, antero-angular 0.054, midlateral 0.065, epimeral 0.117, postero-marginal 0.078, coxal 0.050; mesothorax, width across anterior angles 0.357; metathorax, greatest width 0.367, abdomen (at segment V) 0.385; fore wings, length 0.847; tube, length 0.266, subbasal width 0.189, apical width 0.033, terminal setæ 0.041; segment IX, seta I 0.280, II 0.279, III (?) 0.252. Antennal segments (μ): I 43 (36), II 63 (35), III 72 (36), IV 70 (37), V 64 (36), VI 57 (32), VII + VIII 84 (30).

BRAZIL: Belém, Pará, August 5, 1951, J. D. H., 1 ♀, from dead branch of *Hevea*.

37. *Pygothrips fasciolatus* sp. nov.

Like *quadraticeps*, but with head as wide as long, tube much longer than wide, antennæ and legs with pale areas nearly white, and antennæ stouter, with their fourth to sixth segments subglobose and with abrupt pedicels.

Color dark blackish brown, abdomen darker apically, excepting tube, which is tipped with black and reddish subapically; legs brown, with apices of all femora nearly white; antennæ with segments III-VIII nearly black, I and extreme bases of II and III pale brown, remainder of II nearly white; fore wings brownish gray, somewhat darker basally and apically, with a post-median streak in middle, palest just in front of streak. Head equal in length to greatest width (across cheeks), the latter slightly rounded; postocellar setæ minute; pronotum not thickened medially; fore tarsi strongly toothed; wings without accessory hairs; tube 1.4 times as long as greatest width, somewhat narrowed basally, constricted at tip, remainder with sides nearly straight, set with sharp setigerous tubercles. Length 1.2 mm. (distended, 1.5 mm.); head, total length 0.162, width across eyes 0.151, across cheeks 0.162, least width near base 0.146, length in front of eyes 0.022, width in front of eyes 0.079; eyes, dorsal length 0.066, width 0.039, interval 0.073, ventral length 0.033, width 0.066, interval 0.085; postocellar setæ 0.077, interval 0.120, distance from eyes 0.009; prothorax, median length 0.113, width across coxæ 0.301, antero-marginal setæ 0.005, antero-angular 0.005, midlateral 0.032, epimeral 0.098, postero-marginal 0.055, coxal 0.023; mesothorax, width across anterior angles 0.277; metathorax, greatest width 0.283, abdomen (at segment V) 0.322; tube, length 0.169,

subbasal width 0.119, apical width 0.025, terminal setæ 0.036; segment IX, seta I 0.191, II 0.210, III 0.171, stout setæ about $40 \mu \times 7 \mu$. Antennal segments (μ): I 35 (34), II 50 (33), III 51 (32), IV 45 (34), V 46 (32), VI 45 (30), VII + VIII 70 (26).

Male brachypterous, colored like female; fore legs and tarsal tooth enlarged.

BRAZIL: Jacarepaguá, D. F., May 14-June 22 (holotype on latter date), 1948, and Petrópolis, R. J., May 11, 1948, J.D.H., 11 ♀ ♂, 2 ♂ ♂, from dead branches, etc.

38. *Pygothrips quadraticeps* sp. nov.

From *fasciolatus*, the only other short-headed species of the genus which has the last two antennal segments similarly compactly united, the fourth with two sense-cones on either surface, the ninth abdominal segment with two strong setæ on each side between the three major ones, and the tube dark, this may be known at once by the somewhat longer head and by the coloration of the stouter antennæ.

Color nearly black, darker toward tip of abdomen; tube dark brown, darker basally, narrowly tipped with black; legs brown, with fore tarsi and tips of all femora yellow; antennæ with segments III-VIII nearly black, extreme base of III, all of I, and base and apex of II bright yellow, middle portion of II shaded with brown; fore wings brownish gray, darker basally and apically, with a post-median dark streak at middle, palest just in front of streak. Head slightly longer than wide, cheeks almost straight and parallel; postocellar setæ minute; pronotum not thickened medially; fore tarsi strongly toothed; wings without accessory hairs; tube with sides convexly arcuate and set with sharp setigerous tubercles. Length 1.7 mm. (distended, 2 mm.); head, total length 0.213, width across eyes 0.195, across cheeks 0.203, least width near base 0.190, width across basal collar 0.196, length in front of eyes 0.021, width in front of eyes 0.093; eyes, dorsal length 0.069, width ca. 0.058, interval ca. 0.080; postocular setæ 0.132, interval 0.143, distance from eyes 0.011; prothorax, median length 0.156, width across coxæ 0.414, antero-marginal setæ 0.008, antero-angular 0.071, midlateral 0.087, epimeral 0.160, postero-marginal 0.092, coxal 0.046; mesothorax, width across anterior angles 0.398, metathorax, greatest width 0.406, abdomen (at segment IV) 0.441; tube, length 0.217, subbasal width 0.203, apical width 0.039, terminal setæ 0.057; segment IX, seta I 0.308, II 0.322, III 0.294, intervening setæ 0.140 and 0.070, their diameter 0.008. Antennal segments (μ): I 47 (41), II 67 (36), III 75 (36), IV 68 (38), V 63 (36), VI 54 (32), VII + VIII 85 (30).

BRAZIL: Campo Grande, D. F., June 28, 1948, J.D.H., 1 ♀, from dead branch.

39. *Oedaleothrips brasiliensis* sp. nov.

Allied to *bicolor*, *graminis*, *œmulus*, and *amabilis* by the relatively flat metanotum and the relatively little-produced head, differing from all in the black, instead of yellow or yellowish, thorax.

Color black, with tergum I of abdomen and sides of II white, and with a pair of white spots at sides of V sometimes at sides of IV, also); trochanters and tarsi yellow, fore tibiæ brown apically, remainder of

legs black; antennæ black, with apical third of II and all of III yellow, or III clouded at basal fourth and apically, darkest at tip.

Head broadest across eyes, produced $21\ \mu$ between eyes and bases of antennæ, this process with sides nearly straight and slightly converging anteriorly. Antennal segment IV without ventral tubercle at apex. Mesonotum subreticulate; metanotum roundly convex, not elevated to form a ridge or hump, subreticulate anteriorly, closely longitudinally striate posteriorly.

♀: Length 2.7 mm.; head, length 0.512, width across eyes 0.253, least width just behind eyes 0.238, greatest width across cheeks 0.245; prothorax, length 0.231, width across coxæ 0.406; tube, length 0.209, width at base 0.117, at apex 0.057. Antennal segments (μ): I 76 (52), II 82 (37), III 143 (41), IV 96 (43), V 99 (40), VI 90 (37), VII 60 (30), VIII 57 (19).

Male very similar to female. Nymphs with usual sclerotized areas yellowish, shaded with gray, darker between eyes and in abdominal segments IX and X; internal pigmentation lavender.

BRAZIL: Serra da Cantareira, Franco da Rocha, S. P., June 11, 1948, J. D. H., Frederick Lane, and Lauro Travassos Filho, 15 ♀♀, 15 ♂♂, 6 nymphs, from grass.

40. *Anactinothrips silvicola* sp. nov.

Like *meinerti* and *antennatus*, only, in having short midlateral prothoracic setæ and partially yellow intermediate antennal segments; unlike former in proportion of third antennal segment to fifth and unlike latter in that seventh is not produced at tip.

Color nearly black, tube paler distally, head darkest anteriorly; tarsi and articulations of legs brown; fore wings nearly colorless, narrowly margined with gray; antennæ with two basal and three apical segments dark; III yellow, infusate subbasally and apically, palest subapically; IV darker, largely yellow, nearly black at extreme base, clouded with gray, especially apically; V brownish yellow, darkest at base and just before middle, brown apically; most setæ black, with pale tips. Length 4.5 mm. (distended, 5.6 mm.); head, total length 0.68, width across eyes 0.295, least width shortly behind eyes 0.279, greatest width at anterior seventh of cheeks 0.294, least width at anterior third 0.280, greatest width at posterior third 0.305, width in front of basal collar 0.267, width across basal collar 0.279, length in front of eyes 0.084, greatest width in front of eyes 0.150, least width 0.130; eyes, dorsal length 0.178, width 0.096, interval 0.102; postocular setæ 0.272, interval 0.073, distance from eyes 0.027; dorso-cephalic setæ 0.337, interval 0.090, distance from postoculars 0.147; ocellar setæ 0.091, interval 0.063; prothorax, median length 0.210, width across coxæ 0.589, antero-marginal setæ 0.059, antero-angular 0.034, midlateral 0.068, epimeral 0.217, postero-marginal 0.206, coxal 0.044; mesothorax, width across anterior angles 0.672; metathorax, greatest width 0.749; fore wings, length 2.0; abdomen, greatest width (at segment III) 0.862; tube, length 0.632, sub-basal width 0.144, apical width 0.076, terminal setæ 0.360; setæ on IX about 0.952. Antennal segments (μ): I 99 (71), II 99 (50), III 403 (50), IV 294 (55), V 238 (49), VI 178 (40), VII 116 (36), VIII 96 (24).

Male much like female in color and structure, but with fore legs often tremendously enlarged and with a long spike-like tarsal tooth, always with stridulating mechanism.

BRAZIL: Belém, Pará, August 8-19, 1951 (holotype and allotype August 9), J.D.H., 12 ♀ ♀, 17 ♂ ♂, from dead leaves of *Astrocaryum*, *Heliconia*, etc., in forests.

PALINOTHRIPS gen. nov.*

Close to *Ophthalmothrips* and *Fulgorothesis* (in which the head is produced and the eyes elongated ventrally), but with anterior margin of pronotum not thickened, fore tarsi of female not toothed, and fore wings with a prominent vein in basal half; vertex flat, not overhanging, with a pair of major setae on either side of median ocellus; genal setae strong. Type species: *Palinotrips palustris* sp. nov.

41. *Palinotrips palustris* sp. nov.

Black, tarsi and articulations of legs somewhat paler; antennae with segment III bright yellow, black in apical fifth, IV and V brown in basal two-fifths, IV with a yellowish band just before middle, apex of each and remainder of antennae black; fore wings yellowish, with a prominent dark median vein ending at middle. Length 4.6 mm. (distended, 5.6 mm.); head, total length 0.636, width across eyes 0.322, greatest width across cheeks (just behind eyes) 0.294, width at about anterior third of cheeks 0.280, width at about posterior third of cheeks 0.286, width just in front of basal collar 0.273, width across basal collar 0.283, length in front of eyes 0.129, lateral length of head process 0.085, greatest width of process (at eyes) 0.185, least anterior width 0.165, width near antennae 0.169; eyes, dorsal length 0.168, width 0.088, interval 0.147; eyes, ventral length 0.234, width 0.116, interval 0.091; median ocellus, distance in front of eyes 0.053; postocular setae 0.241, interval 0.182; ocellar setae 0.211, interval 0.106; mouth-cone, length beyond posterior dorsal margin of head 0.188; prothorax, median length 0.277, width across coxae 0.620, antero-marginal setae 0.053, antero-angular 0.045, midlateral 0.120, epimeral 0.185, postero-marginal 0.253, coxal 0.100; mesothorax, width across anterior angles 0.661; metathorax, greatest width 0.683; abdomen, greatest width (at segment III) 0.729; tube, length 0.552, subbasal width 0.167, apical width 0.075, terminal setae 0.469; segment IX, seta I 0.616, II 0.718, III 0.490. Antennal segments (μ): I 96 (75), II 101 (50), III 253 (46), IV 178 (46), V 151 (43), VI 126 (34), VII 92 (30), VIII 90 (22).

Male like female in color and general structure; fore femora with numerous short dark setae, especially on outer surface; fore tarsi with tooth near base.

BRAZIL: São Carlos, S. P., June 21, 1950, D. P. de Souza Dias, 3 ♀ ♀, 6 ♂ ♂, from grass in marsh.

42. *Zeugmatothrips niger* sp. nov.

Allied to *badiicornis*, *annulipes*, *badiipes*, and *femoralis*, but readily known by the wholly black legs and antennae.

**Palin*, again; *thrips*, a wood-worm—in allusion to the occurrence once more of prolonged eyes.

Head transversely striate dorsally, without neck-like groove across base and at sides; bases of postocular and dorso-cephalic setæ forming a trapezium, rather than an arc, the latter pair of setæ arising about midway between postoculars and base of head, both pairs dark brown, as are most of the major setæ of thorax and abdomen; genal setæ slender, inconspicuous, not arising from distinct tubercles. Antennæ dark blackish brown or black, segments IV-VI not at all yellow; III and IV each with a single large dorsal seta; III much longer than VI, VII, or VIII; IV with two sense-cones on outer surface. Prothorax with sutures between notum, epimeron, and episternum. Abdominal tergum I with one seta, only, at sides.

♀: Length 3 mm.; head, length 0.349, width across eyes 0.218, least width shortly behind eyes 0.202, greatest width across cheeks (just behind eyes) 0.206, least width near base 0.185; pronotum, median length 0.154, width across coxæ 0.381; tube, length 0.794, greatest width 0.110, apical width 0.045. Antennal segments (μ): I 70 (46), II 70 (38), III 117 (35), IV 134 (37), V 142 (36), VI 99 (32), VII 80 (28), VIII 67 (20).

Male very similar to female.

BRAZIL: Belém, Pará, Aug. 6-19, 1951, J. D. H. and J. Murça Pires, 10 ♀♀, 3 ♂♂, from dead leaves of assaí (*Euterpe oleracea*).

43. *Zeugmatothrips femoralis* sp. nov.

Allied to *badiicornis*, *annulipes*, *badiipes*, and *niger*, but readily known by the coloration of the fore and hind femora, the former pair white, the latter black.

Head transversely striate dorsally, without neck-like groove across base and at sides; bases of postocular and dorso-cephalic setæ forming a trapezium, rather than an arc, the latter pair of setæ arising about midway between postoculars and base of head, both pairs dark brown, as are most of the major setæ of thorax and abdomen; genal setæ slender, inconspicuous, not arising from distinct tubercles. Antennæ dark blackish brown or black, segments IV-VI not at all yellow; III and IV each with a single large dorsal seta; III much longer than VI, VII, or VIII; IV with two sense-cones on outer surface. Prothorax with sutures between notum, epimeron, and episternum. Abdominal tergum I with one seta, only, at sides.

♀: Length about 3.3 mm.; head, length 0.364, width across eyes 0.246, greatest width across cheeks (at posterior margin of eyes) 0.232, least width near base 0.195; pronotum, median length 0.164, width across coxæ 0.427; tube, length 0.903, greatest subbasal width (beyond base) 0.116, apical width 0.047. Antennal segments (μ): I 70 (54), II 66 (38), III 121 (35), IV 140 (39), V 154 (37), VI 109 (32), VII 84 (27), VIII 81 (21).

BRAZIL: Belém, Pará, July 23, 1951, J. D. H., 1 ♀, from dead branches or rubber trees (*Hevea brasiliensis*) lying on ground in shade.

44. *Zeugmatothrips mumbaca* sp. nov.

Readily known by the uniform dark color of body and legs, and the light yellow fourth to seventh antennal segments.

Head polygonally reticulate dorsally, with a neck-like groove across

base and at sides; bases of postocular and dorso-cephalic setæ forming a trapezium, rather than an arc, the latter pair of setæ arising much closer to postoculars than to base of head, both pairs brown at base and pale yellowish apically; three pairs of stout, dark, conspicuous genal setæ, arising from distinct tubercles. Antennæ with segment III yellow at base and apex, intervening portion shading from nearly black basally to yellow dappled with brown; IV-VII and base of VIII yellow; III and IV each with a single large dorsal seta; III shorter than IV or V, much longer than VI, VII, or VIII; I with two sense-cones on outer surface. Prothorax with sutures between notum, epimeron, and episternum; notum with a pair of major knobbed setæ between postero-marginals; mesonotum also with a pair of knobbed setæ. Abdominal tergum I with two pairs of large setæ at sides, III-VIII each with a pair of pores on subbasal line; tube widest at base.

♀: Length 3 mm.; head, length 0.326, width across eyes 0.242, greatest width across cheeks 0.251, least width at posterior angles of eyes 0.232, width near base 0.209, across basal collar 0.221; pronotum, length 0.196, width across coxæ 0.420; tube, length 0.595, greatest width 0.137, apical width 0.050. Antennal segments (μ): I 65 (52), II 67 (42), III 103 (40), IV 126 (42), V 127 (37), VI 83 (33), VII 56 (30), VIII 80 (19).

Male very similar to female.

BRAZIL: Belém, Pará, Aug. 8-18, 1951, J. D. H., 9 ♀♀, 7 ♂♂, almost exclusively from dead leaves of *Astrocaryum mumbaca* in a dense upland capoeira.

45. *Zeugmatothrips cinctus* sp. nov.

Allied to *borgmeieri*, *peltatus*, and *gracilis*, but with very stout antennæ, dark legs, and pale first abdominal segment.

Head polygonally reticulate dorsally, without neck-like groove across base and at sides; bases of postocular and dorso-cephalic setæ forming an arc, rather than a trapezium, the latter pair of setæ arising only 5-10 μ behind the former, both pairs dark brown, the major setæ of thorax and abdomen yellowish brown; genal setæ slender, pale, not arising from tubercles. Antennæ with segments III-VI yellow, III shaded with blackish brown in basal half exclusive of pedicel; III and IV each with two large dorsal setæ; IV with one sense-cone on either surface. Prothorax without sutures between notum, epimeron, and episternum. Abdomen with segments I and II much paler than III, thus forming a pale transverse band, II with a pair of median dark spots; median tergite of I hat-shaped, the median area forming the crown, the lateral posterior portions the brim; terga I, II, and III with 1, 1, and 2 pairs of major setæ, respectively.

♀: Length 2.2 mm.; head, length 0.253, width across eyes 0.186, greatest width across cheeks (close behind eyes) 0.181, least width near base 0.161; prothorax, median length 0.144, width across coxæ 0.319; tube, length 0.475, width near base 0.084, apical width 0.036. Antennal segments (μ): I 56 (42), II 55 (36), III 72 (32), IV 90 (33), V 100 (33), VI 67 (30), VII 49 (23), VIII 53 (13).

Male very similar to female.

BRAZIL: Belém, Pará, Aug. 9-19, 1951, J. D. H. and J. Murça

Pires, 16 ♀♀, 11 ♂♂, from dead leaves of several genera of palms and *Heliconia psittacorum*.

46. *Zeugmatothrips gracilis* sp. nov.

Allied to *cinctus*, *peltatus*, and *borgmeieri*, but differing from the first in having pale legs and the base of the abdomen dark; from the second in the form of the median tergite of the first abdominal segment; and from the last in the more slender head and antennæ, the stouter tube, and the presence of one and two stout setæ, respectively (instead of two and three), on abdominal terga II and III.

Head polygonally reticulate dorsally, without neck-like groove across base and at sides; bases of postocular and dorso-cephalic setæ forming an arc, rather than a trapezium, the latter pair of setæ arising about 8 μ behind the former, both pairs brown, as are the major setæ of thorax and abdomen; genal setæ slender, pale, not arising from tubercles. Antennæ with segments III-V yellow, VI yellow in pedicel, IV and V shaded in swollen apical portion; III and IV each with two large dorsal setæ; IV with one sense-cone on either surface. Prothorax without sutures between notum, epimeron, and episternum. Abdomen with median tergite of segment I hat-shaped, the median area forming the crown, the lateral portions the brim; terga I, II, and III with 1, 1, and 2 pairs of major setæ, respectively.

♀: Length 2.3 mm.; head, length 0.283, width across eyes 0.178, least width shortly behind eyes 0.158, greatest width across cheeks 0.163, least width near base 0.154; prothorax, length 0.146, width across coxæ 0.312; tube, length 0.609, greatest width 0.090, apical width 0.037. Antennal segments (μ): I 56 (43), II 59 (34), III 81 (31), IV 114 (29), V 124 (31), VI 86 (27), VII 53 (22), VIII 79 (19).

Male very similar to female.

BRAZIL: Belém, Pará, July 26, 1951, J.D.H., 3 ♀♀, 6 ♂♂, from cut grass.

SAUROTHRIPS gen. nov.*

Like *Zeuglothrips* in having three pairs of major cephalic setæ and in the disposition of enlarged setæ on the first two antennal segments; but with four or five pairs of short, stout genal setæ arising from tubercles; head markedly produced between eyes an antennæ; femora with rows of many setigerous tubercles; metanotal setæ not enlarged; fore wings without accessory hairs; abdomen elongated, slender, narrower than thorax, broadest basally, with a pair of prominent lateral tubercles on segments III-VII; tube very long, setose. Type species: *Sauorthrips assai* sp. nov.

47. *Sauorthrips assai* sp. nov.

Color nearly black, with trochanters, knees, and tarsi paler; antennæ nearly black, with bases of segments III-V and apex of VI yellowish, VII and basal three-fifths of VIII nearly white; wings light brown, slightly darker basally, with the median vein nearly black. Length about 5.9 mm. (fully distended, 6.7 mm.); head, total length 0.536, width

**Saurus*, a lizard; *thrips*, a wood-worm—in allusion to the form of the body.

across eyes 0.283, greatest width across cheeks (slightly behind eyes) 0.266, least width shortly behind eyes 0.252, least width just in front of basal collar 0.248, width across basal collar 0.258, length in front of eyes 0.119, lateral length in front of eyes 0.084, greatest width in front of eyes (near antennæ) 0.157, least width (near eyes) 0.140; eyes, dorsal length 0.138, width 0.059, interval 0.165; postocular setæ 0.168, interval 0.126; postocellars 0.144, interval 0.054; dorso-cephalics 0.104, interval 0.118, distance from eyes 0.051; mouth-cone, length beyond posterior dorsal margin of head 0.221; prothorax, median length 0.321, width across coxæ 0.574, exclusive of coxæ 0.420; antero-marginal setæ 0.046, antero-angular 0.077, midlateral 0.045, epimeral 0.114, postero-marginal 0.066, coxal 0.095; mesothorax, width across anterior angles 0.617, metathorax 0.630; fore wings, length 2.02, width near base 0.165, at middle 0.133, near apex 0.165; abdomen, greatest width (at segment II) 0.573; tube, length 1.52, subbasal width 0.123, apical width 0.058, terminal setæ 0.272; setæ on IX, I 0.165, II 0.084, III 0.160. Antennal segments (μ): I 95 (61), II 90 (55), III 156 (44), IV 144 (43), V 140 (43), VI 90 (39), VII 73 (33), VIII 89 (23).

Male very similar to female; fore tarsi with short tooth near base.

BRAZIL: Bélem, Pará, August 11-19, 1951, J. D. H. and J. Murça Pires, 11 ♀♀ and 9 ♂♂, from dead leaves of assaí (*Euterpe oleracea*). The antennal coloration is unique.

CYPHOTHIRIPS gen. nov.*

Allied to *Actinothrips*, the major setæ arising from tubercles, head-process similarly broadened for reception of antennæ, the latter with one enlarged seta, only (on segment I), cheeks with two pairs of setigerous tubercles, fore wings with prominent median vein and accessory hairs; tube very long and slender, setose; but eyes flattened laterally and posterior facets enlarged, dorso-cephalic setæ about as large as postoculars, both arising from large tubercles, metanotum elevated in anterior half in both sexes, this hump in male forming a pair of diverging processes, each with two teeth at tip, the usual large metanotal setæ arising between the teeth. Type species: *Cyphothrips dorsalis* sp.

48. *Cyphothrips dorsalis* sp. nov.

Black, with trochanters, knees, and tarsi yellowish brown, antennæ entirely yellow in segments III-VII, segment VIII yellowish at base, II at apex; fore wings pale brown, somewhat yellowish, median vein nearly black. Length about 4.6 mm. (distended, 5.4 mm.); head, total length 0.524, width across eyes 0.302, least width at posterior angles of eyes 0.263, greatest width shortly behind eyes 0.267, least width (at about anterior third of cheeks) 0.244, greatest width across cheeks at about posterior third 0.267, least width just in front of basal collar 0.258, width across basal collar 0.270, length in front of eyes 0.091, lateral length of head-process 0.053, greatest width of head-process (near antennæ) 0.165, least width (near eyes) 0.137; eyes, dorsal length 0.113, width 0.082, interval 0.127; median ocellus, distance from anterior margin of eyes 0.013; postocular setæ, length 0.155, interval 0.137, dis-

**Kyphos*, hump-backed; *thrips*, a wood-worm—in allusion to the elevated metanotum.

tance from eyes 0.024; dorso-cephalic setæ, length 0.117, interval 0.098, distance from postoculars 0.040; mouth-cone, length beyond posterior dorsal margin of head 0.242; prothorax, median length 0.253, width across coxæ 0.560, exclusive of coxæ 0.434; antero-marginal setæ 0.075, antero-angular 0.110, midlateral 0.097, epimeral 0.135, postero-marginal 0.167, coxal 0.078; mesothorax, width across anterior angles 0.567; metathorax, greatest width 0.631; fore wings, length 1.82, greatest subbasal width 0.124, width near middle 0.116, near apex 0.140, subbasal setæ 0.059 and 0.139; metanotal setæ 0.211; abdomen, greatest width (at segment III) 0.721; tube, length 1.11, subbasal width 0.133, apical width 0.073, terminal setæ 0.252; setæ on IX, I 0.206, II 0.238, III 0.227. Antennal segments (μ): I 90 (69), II 89 (46), III 333 (53), IV 241 (54), V 231 (51), VI 176 (43), VII 125 (36), VIII 104 (26), total 1.39 mm.

Male very much like female; metanotal processes 0.098 mm., setæ 0.161 mm.

BRAZIL: Belém, Pará, August 11-19, 1951, J. D. H., 5 ♀♀, 2 ♂♂, from dead leaves of assaí (*Euterpe oleracea*).

SMICROTHRIPS gen. nov.*

Closely allied to *Preeriella* and *Hyidiothrips*; antennæ 7-segmented, as in the latter genus, but with segments III and IV separate as in the former one, the reduction in number brought about by the union of the morphological sixth and seventh; postocellar setæ minute, postoculars large; prothorax with only three pairs of major setæ (exclusive of coxals), the antero-marginals and midlaterals** very minute. Type species: *Smicrothrips particula* sp. nov.

49. *Smicrothrips particula* sp. nov.

Very pale, only slightly yellowish, fore wings pale gray, antennæ lightly shaded beyond middle of penultimate segment. Length about 0.9 mm. (fully distended, 1.0 mm.); head, total median length 0.083, width across eyes 0.049, across cheeks 0.041, length in front of eyes 0.012, distance between eyes and antennæ 0.004; postocular setæ 0.033, interval 0.020; mouth-cone, length beyond posterior dorsal margin of head 0.034; prothorax, median length 0.070, width across coxæ 0.099, exclusive of coxæ 0.082; antero-angular setæ 0.036, epimeral 0.028, postero-marginal 0.029, coxal 0.037; metathorax, greatest width 0.091; abdomen, greatest width (at segment V) 0.100; tube, length 0.042, greatest width 0.030, apical width 0.019; setæ on segment IX, I 0.033, II 0.034, III 0.033; terminal setæ 0.060. Antennal segments

**Smikros* = mikros, little or small; *thrips*, a wood-worm—in allusion to the extremely minute size of the type species.

**This nomenclature of the prothoracic setæ is open to question. In *Preeriella* the two anterior pairs lie close together near the fore margin of the pronotum, and the outer pair are almost certainly the antero-angulars and the inner the antero-marginals; and this primitive condition is reflected in the presence of eight segments in the antennæ. In *Hyidiothrips*, which is apparently more specialized and which has only seven antennal segments, the inner pair, which would appear to be the antero-marginals, have seemingly become shifted almost into the midlateral position. In *Smicrothrips* one of these two pairs is either missing or minute. This is presumably the antero-marginal pair, but the homologies are obscure.

(μ): I 15 (17), II 24 (19), III 11 (16), IV 23 (22), V 19 (14), VI 31 (14), VII 14 (6).

BRAZIL: Nova Teutonia, Santa Catarina, Feb. 17, 1949, Fritz Plau-
mann, ♀ ♀, from *Lantana*.

50. *Hyidiotrips tessellatus* sp. nov.

Differing conspicuously from its congener by the longer, strongly polygonally reticulate head.

Color brown, with red internal pigmentation; antennæ light gray in segments I and II, shading to dark gray-brown in IV-VII; dorsal surface of head with heavy, elevated, nearly black lines of sculpture marking off large polygons; metanotum with an acute median production; setæ formed as in type of genus. Length 0.79 mm.; head, length 0.094, width across eyes 0.068, across cheeks 0.067, least width near base 0.062, length in front of eyes 0.019, greatest width in front of eyes 0.039, distance between eyes and antennæ 0.009; eyes, dorsal length 0.043; postocular setæ, length (chord of arc) 0.043, interval 0.056, distance from eyes 0.007; postocellar setæ, length 0.016, interval 0.014; mouth-cone, length beyond posterior dorsal margin of head 0.036; prothorax, median length of pronotum 0.068, width (inclusive of coxæ) 0.136, exclusive of coxæ 0.108; antero-marginal setæ* 0.044, antero-angulars 0.049, epimerals 0.044, postero-marginals 0.052, coxals 0.042; mesothorax, greatest width 0.116, metathorax 0.124; fore wings, length 0.454, subbasal width (exclusive of scale) 0.030, least width (at basal third) 0.010, greatest subapical width 0.017, subbasal setæ 0.038, 0.039, 0.039; abdomen, greatest width (at segment V) 0.113; tube, length 0.044, greatest subbasal width 0.032, apical width 0.018; setæ on IX 0.067, 0.068, 0.050; terminal setæ 0.080. Antennal segments (μ): I 16 (18), II 24 (21), III 42 (27), IV 24 (20), V 28 (15), VI 15 (7), VII 20 (5).

BRAZIL: Nova Teutonia, Santa Catarina, May 25, 1949, Fritz Plau-
mann, 3 ♀ ♀, from *Solanum*.

*See footnote under *Smicothrips* gen. nov.

PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON

SOME RECORDS AND DESCRIPTIONS OF CHILOPODS FROM
JAPAN AND OTHER ORIENTAL AREAS

BY RALPH V. CHAMBERLIN AND YUSHI M. WANG

The chilopods recorded in the present paper form part of the R. V. Chamberlin collection at the University of Utah. Most of the material studied was received some years ago through the kindness of Profs. Y. Takakuwa, and S. Hozawa, who, with associates as noted in connection with each species, personally collected a large part of the specimens. Unless otherwise noted, the localities given under each species will be understood to be in Japan. A few specimens are from Korea and China, inclusive of Formosa (Taiwan) and Manchuria.

Order GEOPHILIDA

Family HIMANTARIIDAE

Stigmatogaster japonica Takakuwa

Stigmatogaster japonica Takakuwa, 1935, Annot. Zool. Japan, vol. 15, p. 50.

Locality: Chenghsien, Chekiang, China. Two males and one female collected by Yushi M. Wang in June, 1947.

These specimens have 73 pairs of legs.

Himantarium sp.

Locality: Japan. One young specimen, 11 mm. in length, was intercepted in a cargo from that country at Philadelphia, April 30, 1926.

Family SCHENDYLIDAE

Escaryus japonicus Attems

Escaryus japonicus Attems, 1927, Zool. Anzeiger, vol. 72, p. 299.

Locality: Mt. Hokkoda, Aomori Prefecture, Japan. One female, 55 mm. long, was taken July 7, 1928, by S. Hozawa.

Family ORYIDAE

Orphnaeus brevilabiatus (Newport)

Geophilus brevilabiatus Newport, 1845, Trans. Linn. Soc. London, vol. 19, p. 436.

Orphnaeus brevilabiatus Pocock, 1894, Weber's Reise, vol. 3, p. 317.

Locality: Japan. One female 64 mm. long taken by S. Sakaguchi.

Family MECISTOCEPHALIDAE

Mecistocephalus takakuwaii Verhoeff

Mecistocephalus takakuwaii Verhoeff, 1934, Zool. Jahrb. Jena, vol. 66, p. 36.

Locality: Tokyo, Japan. Three females, between 29 and 34 mm. in length, taken in Sept., 1933, by Takakuwa.

Mecistocephalus mikado Takakuwa

Mecistocephalus mikado Takakuwa, 1928, Bot. and Zool. Tokyo, vol. 2, p. 707.

Locality: Japan. One female, 38 mm. long, taken by S. Sagaguchi.

Mecistocephalus smithi Pocock

Mecistocephalus smithi Pocock, 1895, Ann. Nat. Hist., ser. 6, vol. 15, p. 351.

Locality: Chengsien, Chekiang, China. Three females and four males, 48 to 85 mm. in length, taken in June, 1947, by Yuhsi M. Wang.

Nodocephalus doii Takakuwa

Nodocephalus doii Takakuwa, 1940, Trans. Nat. Hist. Soc. Formosa, vol. 30, p. 41.

Locality: Sendai, Japan. One male, 18 mm. long, taken Sept. 29, 1928, by K. Oka.

This species was previously recorded only from Korea.

Dicellyphilus carniolensis (Koch)

Clinopodes carniolensis Koch, 1847, Krit. Revis., vol. 3, p. 185.

Locality: Nikko, Japan. One young specimen 12 mm. long and apparently this species was taken in Sept., 1933, by Takakuwa.

Tygarrup javonicus (Attems)

Tygarrup javonicus Attems, 1907, Mitt. Mus. Hamburg, vol. 24, p. 95.

Locality: Chengsien, Chekiang, China. One male and seven females, 25 to 37 mm. in length, taken in 1947 by Yuhsi M. Wang.

Prolamnonyx holstii (Pocock)

Geophilus holstii Pocock, 1895, Ann. Nat. Hist., ser. 6, vol. 15, p. 352.

Prolamnonyx holstii Silvestri, 1919, Rec. Ind. Mus., vol. 16, p. 85.

Locality: Japan. Ten males and females taken in Sept., 1935. Takakuwa indicates that this species is common throughout Japan.

Family GEOPHILIDAE

Pleurogeophilus takakuwae Verhoeff

Pleurogeophilus takakuwae Verhoeff, 1935, Annot. Zool. Japan, vol. 15, no. 1, p. 46.

Locality: Tokyo, Japan. Two females, 28 and 65 mm. in length, taken in Sept., 1933, by Takakuwa.

Family LINOTAENIIDAE

Linotaenia transylvanicus (Verhoeff)

Scolioplanes transylvanicus Verhoeff, 1928, Zool. Anzeiger, vol. 73.

Locality: Japan. One female, 21 mm. long, taken in Sept., 1933, by Takakuwa.

Linotaenia hirsutipes (Attems)

Scolioplanes hirsutipes (Attems), 1927, Zool. Anzeiger, vol. 72, p. 293.

Locality: Tatsuno-Kuchi, Sendai, Japan. One female 28 mm. in length, taken in Oct., 1928, by S. Kabayashi.

Family PACHYMERINIDAE

Pachymerium ferrugineum Koch

Geophilus ferrugineus C. L. Koch, 1835, Deutschl. Crust., Myr. und Arach., fasc. 3, vol. 2.

Pachymerium ferrugineum C. L. Koch, 1847, Koch-Panzer, Krit. Rev., vol. 3, p. 187.

Locality: Kamazawa, Japan, 5 females taken in potato field, and

beach at Dusi, Japan, 4 females and males, all taken in Sept., 1933, by Takakuwa.

Pachymerium causicum Attems

Geophilus (*Pachymerium*) *causicus* Attems, 1903, Zool. Jahrb. Syst., vol. 18, p. 256.

Locality: Northern Kii, Japan. One young specimen.

Order SCOLOPENDRIDA

Family CRYPTOPIDAE

Otocryptops sexspinosus (Say)

Cryptops sexspinosus Say, 1821, Jour. Acad. Nat. Sci. Phila., vol. 2, p. 112.

Scolopocryptops sexspinosus Newport, 1845, Trans. Linn. Soc. London, vol. 19, p. 407.

Otocryptops sexspinosus Pocock, 1895, Ann. Nat. Hist., ser. 6, vol. 15, p. 351.

Locality: Sendai, Japan. Three females and three young, Nov., 1928, taken by K. Oikawa.

Izu Migadake, Miyagi Prefecture, one female, Oct., 1928, taken by S. Kobayashi.

Yokohama, at Hot Spring, Aomori Prefecture, one female, July 8, 1928, taken by Hozawa.

Nakayamadaira, Naruko, Hot Spring, Nov. 8, 1928, one female, collected by K. Ito.

Northern Kii. Two females taken in Oct., 1929.

Otocryptops rubiginosus (Koch)

Scolopocryptops rubiginosa L. Koch, 1878, Verh. Ges. Wien, vol. 27, p. 792.

Otocryptops rubiginosa E. Haase, 1887, Abh. Mus. Dresden, n. 5, p. 97.

Localities: Aita, Lagana Prefecture, one female, one specimen taken Aug. 4, 1928, by Z. Yamaguchi.

Wakamoura, Wakayama Prefecture, one taken Sept. 10, 1928, by K. Oka.

Yoyogi, Tokyo, one taken Aug., 1928, by K. Nakayama.

Aita Nagano Prefecture, one young Aug. 12, 1928, taken by Z. Yamaguchi.

Kawijo, Mura Yamagata Prefecture, one taken June 25, 1928, by Y. Abe.

Northern Kii, one taken by Y. Takakuwa, Oct., 1929.

Cryptops haasei Attems

Cryptops haasei Attems, Zool. Jahrb. Syst., vol. 18, p. 105.

Locality: Japan, without more definite locality, S. Sakaguchi collector. One specimen 22 mm. in length and having 8+8 prosternal bristles may represent a new variety.

Cryptops japonicus Takakuwa

Cryptops japonicus Takakuwa, 1934, Trans. Sapporo Nat. Hist. Soc., vol. 13, p. 404.

Locality: Chungsien, Chekiang, China. One male 22 mm. long, one female 17 mm. long and two incomplete specimens taken in June, 1947, by Yuhsi M. Wang.

Family OTOSTIGMIDAE

Rhysida longipes brevicornis Takakuwa

Rhysida longipes brevicornis Takakuwa, 1934, Trans. Nat. Hist. Soc. Formosa, vol. 24, p. 224.

Locality: Japan. Three adults and one immature taken in Sept., 1933, by Takakuwa.

Otostigmus striatus Takakuwa

Otostigmus striatus Takakuwa, 1940, Trans. Nat. Hist. Soc. Formosa, vol. 30, p. 209.

Locality: Japan. One specimen 56 mm. in length taken by Takakuwa in Sept., 1933.

Ootostigmus scaber Porat

Ootostigmus scaber Porat, Sv. Akad. Handl. Bihang, vol. 4, no. 7, p. 10.

Locality: Chengsien, Chekiang, China. One female 31 mm. long taken in June, 1947, by Yuhsi M. Wang.

One specimen 26 mm. long shows characters annectant between the present species and *striatus*. The specimen was taken in Japan by Dr. Don M. Rees and shows the following characters: Antennae composed of 20 articles, 14th legs with two tarsal spines, the 20th with one tarsal spine, tergites keeled from the fifth on.

Two females, 40 mm. and 60 mm. in length, seem to be annectant with *insularis*. They were taken by Yuhsi M. Wang in June, 1947, at Chengsien, Chekiang, China. They show the following characters: the 9th legs with two tarsal spines, the 20th with one such spine, and the head and first tergite dark red-brown.

Otostigmus politus Karsch

Otostigma politum Karsch, 1831, Berlin ent. Zeit., vol. 25, p. 219.

Locality: Korea, at An, South Phyang-An. One female 38 mm. long, taken in Aug., 1928, by To-Gen Tae.

Family SCOLOPENDRIDAE

Scolopendra subspinipes subspinipes Leach

Scolopendra subspinipes Leach, 1815, Trans. Linn. Soc. London, vol. 11, pl. 383.

Localities: Kamijo-Nura, Yamagata Prefecture. One female 82 mm. in length, taken June 25, 1928, by Y. Abe.

Tobata, Fukuoka Prefecture. One female 70 mm. in length, taken in July, 1928, by K. Mutsomoto.

Chekiang, China. One adult and two young taken in Sept., 1928, by M. T. Jem.

Chengsien, Chekiang, China. Two females and three young taken in June, 1947, by Yuhsi M. Wang.

Scolopendra subspinipes japonica Koch.

Scolopendra japonica L. Koch, 1878, Verh. Ges. Wien, vol. 27, p. 790. Localities: Kamijo-Mura, Yamagata Prefecture. Two young taken June 25, 1928, by Y. Abe.

Northern Kii. Two young taken in Oct., 1929, by Takakuwa.

Sendai. Two females and one male taken May-Aug., 1928, by K. Ito.

Scolopendra morsitans Linné

Scolopendra morsitans Linné, 1758, Syst. Nat., ed. 10, p. 638.

Locality: Japan. Two females and one male without further data.

Order LITHOBIIDA
Family HENICOPIDAE
Lamyetinus sp.

Locality: Japan.

Five females, which it is thought best not to place specifically at this time, were taken in a cargo from Japan at quarantine at Honolulu on Mar. 18, 1938.

Esastigmatobius longicornis Takakuwa

Esastigmatobius longicornis Takakuwa, 1936, Trans. Nat. Hist. Soc. Formosa, vol. 26, p. 85.

Locality: Tokyo, Japan. One male and one female taken in Sept., 1933, by Takakuwa.

Esastigmatobius curticornis, new species

A species apparently distinguished from others in the smaller number of antennal articles, this being from 28 to 38, and in having the eye-spot obscure.

General color brown, with antennae yellow. First two articles of antennae large in comparison with the others. Prosternal teeth minute, in number 6+6. Tarsi of first legs biarticulate, of the sixth 4-jointed, the eleventh 11-jointed. In the thirteenth legs the first tarsal division is composed of six articles, the second of three. The anal legs have the first composed of 13 joints, the second of 21.

Locality: Tokyo, Japan.

Three females, 9 to 11 mm. in length, and two males, 11 to 13 mm. in length.

Family LITHOBIIDAE
Tidabius emporus Chamberlin

Tidabius emporus Chamberlin, 1941, Bull. Univ. Utah, Biol. Ser., vol. 6, no. 6, p. 3.

Locality: Japan.

Two females and one immature specimen were taken in cargo from Japan in quarantine at Honolulu on Aug. 11, 1938 and Sept. 15, 1939.

Chinobius sachalinus Verhoeff

Chinobius sachalinus Verhoeff, 1937, Arch. Nat. Leipzig, vol. 6, p. 224.

Localities: Sendai, Japan. One male and one female taken Sept. 13, 1928, by Z. Ohizumi.

Sachalin, Japan. Three males and five females, topotypes, were taken in Sept., 1933, by Takakuwa.

Chinobius would seem to be related to the North American *Arebius* rather than to *Paobius*. These three genera agree in having the articles of the antennae fixed at 20, in having none of the dorsal plates with posterior corners produced, the anterior tarsi biarticulate, and the prosternal teeth normally 2+2, rarely 3+3. It seems justifiable to keep *Chinobius* apart from *Arebius*, as well as *Paobius*, in having both the penult and the anal legs of the male enlarged or crassate and otherwise secondarily modified in the male while lacking any such modifications in the two latter genera. The genus, as in *Arebius*, has the legs between the first and the twelfth pairs, with two dorsal tibial spines, with one always present on the penult legs. The head has marginal interruptions and the claw of the female genital forceps is always entire. It differs

from *Arebius* in having none of the posterior coxae laterally armed, as far as at present known.

***Chinobius chekianus* new species**

Pale chestnut to dark chestnut, usually with a median longitudinal dorsal stripe.

Antennae composed of 20 articles, relatively long.

Ocelli in three series; e.g., 1+3, 3, 2.

Prosternal teeth 2 + 2; the median sinus u-shaped.

Ventral spines of first legs, 0,0,2,1,1; dorsal, 0,0,2,2,2. Spines of penult legs: ventral, 1,3,2,2 to 0,1,3,3,1, the dorsal, 1,0,3,2,1, claws 2. Spines of anal legs, 0,1,3,2,1; dorsal, 1,0,3,1,0, claws 2. No lateral spines on coxae.

Coxal pores: 6,6,6,5 to 7,6,6,6.

In the anal and penult legs the femur crassate, enlarging distad.

Claw of female genital forceps entire; basal spines 3+3.

Length: 12 to 17 mm.

Locality: Chenghsien, Chekiang, China. Two males and two females taken in June, 1947, by Yuhsi M. Wang.

***Chinobius chekianus tumeopes* var. nov.**

Light chestnut, without a longitudinal dorsal stripe.

Ocelli in two rows; 1+2,2.

Ventral spines of the first legs, 0,0,2,1,1, the dorsal, 0,0,1,2,1. Spines of thirteenth legs: ventral, 0,0,3,3,2; dorsal, 0,0,3,2,2. Spines of penult legs: ventral 0,1,3,2,2 to 0,1,3,3,2; dorsal, 1,0,3,1,1, with 2 claws. Spines of anal legs: ventral, 0,1,3,2,1; dorsal, 1,0,3,1,0; claws 2.

Coxal pores, 7,6,6,5 or 6,6,5,5.

This form differs from the typical species described above, in having the tibia and femur of penult and anal legs more abruptly and more strongly crassate.

Length, about 16 mm.

Locality: Chenghsien, Chekian, China. Two males taken in June, 1947, by Yuhsi M. Wang.

***Arebius vosseleri* (Verhoeff)**

Lithobius vosseleri Verhoeff, 1901, Acta. Acad. Germ., vol. 78, p. 441.

Lithobius (*Archilithobius*) *vosseleri* Verhoeff, Zool. Anzeiger, vol. 123, p. 137.

Lithobius (*Paobius*) *vosseleri* Verhoeff, 1944, vol. 137, p. 103.

Locality: Sendai, Japan. One male, taken Sept. 13, 1928, by Z. Okizumi.

***Arebius chosenus* new species**

Dark brown, the anterior border of prosternum whitish in type.

Antennae composed of 20 articles and prosternum with 2+2 teeth as usual.

Ocelli 1+4,3,2.

Spines of thirteenth legs: ventral, 0,1,3,3,2; dorsal, 0,0,3,2,1. Spines of penult legs: 0,1,3,3,2; dorsal, 1,0,3,1,1. Spines of anal legs: ventral, 0,1,3,3,2; dorsal, 1,0,3,1,1; claws 2.

Coxal pores large, 7,7,7,6.

No special peculiarities in anal legs of male.

Claw of female genital forceps entire; basal spines, 2+2.

Length 12-23 mm.

Locality: Mang Dyek-Ri, Shun-An, South Phyeng An, Korea. Three females and four males taken in Aug., 1928, by To-Gen Tae.

***Arebius chengsiensis* new species**

Color pale chestnut.

Ocelli 1+2,1, or 1+2,2.

Spines of first legs: ventral, 0,0,2,2,1; dorsal, 0,0,1,2,2. Spines of penult legs: ventral, 0,1,3,2,1; dorsal, 1,0,3,2,1 or 0,0,3,2,1. Spines of anal legs: ventral, 0,1,3,2,1; dorsal, 1,0,3,1,0.

Coxal pores round, small, 5,5,5,5 or 4,4,4,4.

Claw of genital forceps entire; basal spines, 2+2.

Anal legs of male without special modifications.

Length: about 10 mm.

Locality: Chengsien, Chekiang, China. Three males and one female taken in June, 1947, by Yuhsi M. Wang.

***Monotarsobius* sp.**

Locality: Japan. One female taken at quarantine in Honolulu, June 25, 1938.

***Monotarsobius crassipes holstii* (Pocock)**

Lithobius (Archilithobius) holstii Pocock, 1895, Ann. Nat. Hist., ser. 6, vol. 5, p. 349-351.

Localities: Yaagata. One male taken June 21, 1928, by Y. Abe.

Sappora. Five males and females, Sept., 1933. Takakuwa collector.

Tokyo. One male, Sept., 1933, Takakuwa collector.

Chengsien, Chekiang, China. Four females, young, taken in June, 1947, by Yuhsi M. Wang.

***Monotarsobius minoris* Takakuwa**

Monotarsobius minoris Takakuwa, 1942, Trans. Nat. Hist. Soc. Formosa, vol. 32, p. 360-364.

Locality: Sachalin, Japan. One male and two females taken in Sept., 1933, by Takakuwa.

***Monotarsobius rhysus* Attems**

Monotarsobius rhysus Attems, 1934, Zool. Anzeiger, p. 114.

Locality: Formosa, China. One male, Sept., 1933, collected by Takakuwa.

***Monotarsobius argaeensis* Attems**

Monotarsobius argaeensis Attems, 1934, Zool. Anzeiger, p. 114.

Locality: Formosa, China. Two females taken in Sept., 1933, by Takakuwa.

***Ezembius yamashinai* (Verhoeff)**

Archilithobius yamachinai Verhoeff, 1938, Zool. Anzeiger, vol. 123, p. 103.

Locality: Sachalin, Japan. Three males and two females, Sept., 1933.

Chisima, near Kaneto-Chakta, Japan. One male taken also in Sept., 1933, by Takakuwa.

***Nipponobius cepeus* Chamberlin**

Nipponobius cepeus Chamberlin, 1940, Pan-Pac. Entomologist, vol. 16, p. 50.

Locality: Japan. One female taken in cargo at quarantine July 6, 1937, and one female at same in April, 1938.

***Alaskobius takakuwai* new species**

Rufous yellow in color.

Antennae short, with 18 or 19 articles.

Ocelli 1+2,4.

Head with marginal interruptins. Prosternal teeth 2+2.

Spines of first legs: 0,0,1,2,1; dorsal, 0,0,1,2,0. Spines of thirteenth legs: ventral, 0,0,3,3,2; dorsal, 1,0,3,0,1. Spines of penult legs, 0,1,2,1,0; dorsal, 1,0,3,1,0; claws 2. Spines of anal legs: ventral, 0,1,3,1,0; dorsal, 1,0,3,0,0, or 1,0,2,1,0; claws 2. None of the coxae laterally armed.

Coxal pores 3,4,4,3.

In the male the anal legs have a lobe on dorsal side at end of the fourth joint, with fourth and fifth joints dorsally sulcate in both anal and penult legs.

Length, 7.5 to 8 mm.

Localities: Chisema, near Behling, Japan. Two males.

Formosa, China. One male. All taken by Takakuwa in Sept., 1933.

Family ETHOPOLIDAE

***Bothropolys migrans* Chamberlin**

Bothropolys migrans Chamberlin, 1930, Pan-Pac. Entomologist, vol. 7, no. 2, p. 69.

Locality: China. One male taken in cargo from China at quarantine at Honolulu, Nov. 2, 1938.

Japan. One specimen taken in cargo at quarantine at Philadelphia, also in Nov., 1938.

***Bothropolys asperatus* (Koch)**

Lithobius asperatus Koch, 1878, Verh. zool.-bot. Ges. Wien, vol. 27, p. 788.

Localities: Nakayama-daira, Naruka, near Senda. One male Nov. 2, 1928, collected by K. Ito.

Izuma-dake, Miyogi Prefecture, near Sendai. One male, Oct., 1928, S. Kobayashi.

Northern Kii. Three males, Oct., 1929, taken by Takakuwa.

Takao, near Tokyo. One male.

Tokyo. Six males and two females, Sept., 1933, taken by Takakuwa.

Tatesima. One male, Sept., 1933.

Mang-Dyek-Ri, Shun-An, South Phyeng-An, Korea. Taken by To-Gen Tae, in Aug., 1928.

Korea. Two males and females taken in Sept., 1933, by Takakuwa.

Chengsien, Chekiang, China. Two females and three males taken by Yuhsi M. Wang in June, 1947.

***Bothropolys asperatus imaheransis* Verhoeff**

Bothropolys imaherensis Verhoeff, 1937, Arch. Naturg., vol. 6, p. 186.

Bothropolys asperatus imaherensis Takakuwa, 1949, Acta Arach., vol. 11, nos. 3/4, p. 58.

Localities: Japan. Taken in cargo at New York, Jan. 23, 1951, one female.

Yoyogi, Tokyo. One female taken Aug., 1928, by K. Nakayama.

Sendai. One female, Aug. 4, 1928, K. Tomita collector.

Tokyo. Three females and two males taken in Sept., 1933, by Takakuwa.

Chenghsien, Chekiang, China. One female taken in June, 1947, by Yuhsi M. Wang.

Aita, Nagano Prefecture. Two males and females taken by Z. Yamaguchi, Aug. 4, 1928.

It is doubtful whether this is more than a variety of *asperatus*. It occurs in the same localities and various specimens are intermediate or annectant between species and variety, e.g., the specimens above recorded from Aita and Sendai.

Genus ZYGETHOPOLYS Chamberlin

Zygethopolys Chamberlin, 1925, Bull. Mus. Comp. Zool., vol. 57, no. 7, p. 408.

Parabothropolys (as subgen. of *Bothropolys*) Verhoeff, 1938, Zool. Anzeiger, vol. 123, p. 101.

In addition to the species listed below, a second Japanese species, *Z. crassidentatus* (Takakuwa), described in Acta Arachn., 1949, p. 59, clearly pertains to this genus of which an Alaskan species, *Z. nothus* Chamberlin is the generotype. The two Japanese species show a tendency for the posterior angles of tergites 6 and 7 to be more or less produced in addition to those of plates 9, 11, and 13. The variability of this feature, however, is such that it is improbable that it can be maintained by itself as the basis for subgeneric distinction.

Zygethopolys richthofeni (Verhoeff)

Bothropolys (*Parabothropolys*) *richthofeni* Verhoeff, 1938, Zool. Anzeiger, vol. 123, p. 101, fig. 1.

Locality: Ikao, Japan. One female taken in Sept., 1933, by Takakuwa.

Originally described from Korea, the type being a single female, accompanied by an immature male.

Order SCUTIGERIDA

Family Scutigeridae

Thereuonema tuberculata (Wood)

Cermatia tuberculata Wood, 1863, Jour. Acad. Nat. Sci. Philadelphia, vol. 12.

Thereuonema tuberculata Verhoeff, 1905, Zool. Anzeiger, vol. 29, p. 356.

Localities: Sendai. One male, Aug. 2, 1928. Tomita collector.

Tsuchisawa, Iwate Ken. One male taken by K. Oikawa in Aug., 1928,

Aita, Nagano Prefecture. One male taken by Z. Yamaguchi, Aug. 4, 1928.

Tohoku University, Sendai. Two females May 16, 1928, K. Ito collector.

Hot Spring, Asamushi Aomori. Two males, July 9, 1928, K. Ito collector.

Tobata, Fukuoka Prefecture. Three females, July 1928, collected by K. Matsumoto.

Yoyogi Tokyo. Three females taken by K. Matsumoto in July, 1928.

Tokyo. Two females and five males taken Sept., 1933, by Takakuwa.

Chenghsien, Chekiang, China. Two females and three males taken by Peter Chang in June, 1947.

Thereuonema bellica (Muralewitch)

Scutigera bellica Muraliwitch, 1902, Zool. Anzeiger, vol. 25, p. 110.

Thereuonema bellica Verhoeff.

Locality: Mang-Dyek Ri, Shun-An, South Phyeng An, Korea. Three males and two females taken in Aug., 1928, by To-Gen Tae.

Thereuonema mandschuri Verhoeff

Thereuonema mandschuri Verhoeff, 1936, Zool. Anzeiger, vol. 115, p. 11.

Localities: Korea. One male, one female and three young taken in Sept., 1933, by Takakuwa.

Manchuria, China. Four males and two females taken in Sept., 1933, by Takakuwa.

Thereuonema hilgendorfi Verhoeff

Thereuonema hilgendorfi Verhoeff, 1905, Zool. Anzeiger, vol. 29, p. 10.

Locality: Chenghsien, Chekiang, China. One male taken by Y. M. Nee.

Thereuopoda viridescens Verhoeff

Thereuopoda viridescens Verhoeff, 1936, Bull. Raffles Mus. (Singapore), vol. 13, p. 261.

Locality: Koshan, Taiwan (Formosa). One male taken by Y. M. Nee.

Thereuopoda clunifera (Wood)

Cermatia clunifera Wood, 1863, Jour. Acad. Nat. Sci. Philadelphia, vol. 10, p. 16.

Thereuopoda clunifera Verhoeff, 1905, Verh. SB Ges. Naturf. Berlin, no. 2, p. 16.

Localities: Shisakesijima, Kobe. One female taken in Sept., 1933, by Takikuwa.

Tokyo. Two females, 34 and 48 mm. in length, taken by Don M. Rees in Aug., 1947.

Peiping, China. One male and three females taken by N. Gist Gee in 1925.

Chenghsien, Chekiang, China. Two females, one having a length of 50 mm., taken in June, 1947, by C. H. Chen.

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NEW RECORDS OF NEOTROPICAL GENTIANACEAE—III

BY JOSEPH EWAN

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This series of notes on the two genera, *Macrocarpaea*, a revision of which has been published,¹ and *Symbolanthus*, of which an unrecognized species is here described, supplements two earlier reports on neotropical Gentianaceae.

Macrocarpaea

1. *Macrocarpaea cerronis* Ewan, U. S. Nat. Herb. Contr. 29:223. pl. 2. 1948.

It was with considerable hesitancy that I described two species of *Macrocarpaea*, *M. cerronis* and *M. salicifolia*, as distinct from geographically adjacent *tepuis* of Venezuela on the basis of single collections in each instance. These two species displayed several critical morphological characters in common, as will be easily seen from a study of the facing illustrations in my account. I concluded these two collections represented distinct species not only on the basis of their differences indicated in the species key (p. 216) but because they evidently occupied different altitudinal positions on these respective cerros. Additional collections may change these interpretations but it is of interest that the second collection of *M. cerronis*, just made available to me for study, supports my conclusions as to both the distinct morphology of the species and its zonal position. A collection made by Captain Felix Cardona P. (no. 2679), Jan. 1949, on "cumbre del Cerro Auyan, altura 2,500 mts.," State of Bolivar (US) is a good match for the type, though the corolla in the latest collection is larger (4.5 cm. long) and the calyx lobes are longer (9-10 mm. long).

2. *Macrocarpaea glaziovii* subsp. *constricta* (Griseb.) Ewan, comb. nov. *Lisyanthus obtusifolius* var. *constrictus* Griseb. Gen. et Sp. Gent. 175. 1839. Type: Langsdorf s. n., "prov. Minas Geraes" in Herb. Hookeria-num, Kew.

Representative collection: "sous-frutescent, fl. verdatres," Corcovado, a Paineiras, Rio de Janiero, Brazil, *Glaziou* 900 (C).

In the course of my recent report on *Macrocarpaea glaziovii*,² I distinguished that species from *M. obtusifolia* of Brazil. There is at Copenhagen, in addition to the type of *M. glaziovii*, a second *Glaziou* collection (no. 900) without locality data, which was mistakenly identified in 1896 by E. Gilg as *Macrocarpaea obtusifolia*. The calyces are not pubescent, however, as in that species, and though the corollas are rather

¹Contr. U. S. Nat. Herb. 29:203-251. 5 pls. 1948.

²Proc. Biol. Soc. Wash. 64:134. 1951.

larger than the type of *M. glaziovii*, it certainly is to be referred to that species rather than to *M. obtusifolia*. The locality for this Copenhagen sheet was ascertained by reference to A. F. M. Glaziov's "Liste des plantes du Bresil central recueillies en 1861-1895" (Mem. Bot. Soc. France 3:474 (accompanying Bull. ser. 4, vol. 10 or whole no. vol. 57) 1910).

3. *Macrocarpaea valerii* Standl.

The first historical collection of this Costa Rican species was filed as "Chelonanthus acutangulus," as originally identified by Standley nearly thirty years ago: La Palma, 8 July 1923, *F. L. Stevens* 279 (US). Dr. W. W. Diehl has kindly examined for me the map accompanying Stevens and Tehon's paper on Costa Rica and Panama fungi³ and La Palma is shown thereon at a point about midway between Puntarenas and Limon and approximately 15 kilometers northeast of San Jose. From this information it appears that both *Macrocarpaea valerii* and *M. subcaudata* occur about La Palma, but there is no present reason to doubt the distinctness of *M. subcaudata*, judging from the two sheets of Werckle's collection examined.

Symbolanthus

4. *Symbolanthus gaultherioides* sp. nov.

Shrub about 1 m. high; upper stems squarish, the internodes short throughout, articulated and rather prominently ridged in drying, thinly black-dingy pubescent with short blackish hairs; leaves small, closely overlapping in the manner of many ericads, rather fleshy when fresh, drying to leave a distinct white cartilaginous edge, oval to shortly ovate, subtruncate at the base, 25-32 cm. long, 17-20 mm. wide, barely acute, very sparsely pubescent with gray or whitish hairs beneath especially along the midrib; flowers borne terminally at ends of the leafy shoots, 56-70 (or 75) mm. long, calyx cylindrical, glabrous or lightly viscid-pubescent, 18-20 mm. long, a little constricted at the mouth, the three outer lobes a little rounded at apices, 12-14 mm. long, the two alternate inner lobes strictly acute; corolla red, the tube slender, cylindrical, 17-19 mm. long, the lobes broadly ovate or oblong-ovate, shortly cuspidate, finely erosulate, venulose, the lower lobes evidently not strongly dejected or reflexed; fruit unknown.

Frutex ca. 1 m. altus; ramis subtetragonis, internodis brevis, sparse atro-pubescentibus; foliis parvis, ericoideis, subcarnosis, ultime distincte albomarginatæ, ovalis vel brevi-ovatis, subtruncatis ad basim, 25-32 cm. longis, 17-20 mm. latis, vix acutis, infra sparse cano-puberulentis; floribus terminalibus ad apicem ramis foliosis, 56-70 (vel 75) mm. longis, calyx cylindricis, glabris vel aliquantum viscido-pubescentis, 18-20 mm. longis, ad faucem subconstrictis, 12-14 mm. longis, 3 lobis subrotundatis sed 2 lobis alternatis valde acutis; corolla rubra, cylindricis, 17-19 mm. longis, lobis late ovatis vel oblongo-ovatis, minute erosulatis, breve cuspidatis, venulosis, omnibus lobis horizontalibus vel suberectis; fructus ignotus.

Type collected on Paramo de Sonson, alt. 2700-2850 meters, Dept.

³Univ. Ill. Biol. Monog. 1(2) 1927.

Antioquia, Colombia, by *Rafael Guarín and Bro. Daniel* 3476, Dec. 1943 (US 1,857,255).

Second collection: Colombia: Dept. Antioquia: Cerro de la Vieja, 2800 m., 26 Dec. 1938, *Bro. Daniel* 1693 (US).

Symbolanthus gaultherioides is closely allied to *S. microphyllus* Gilg of Peru (cf. Field Museum photo 10236 of type formerly in Berlin Herb.). Both species belong to the alliance of *Symbolanthus pauciflorus* Gilg, but *S. gaultherioides* and *S. microphyllus* are more closely related to each other than *S. pauciflorus* is to either of the latter species. This is an interesting example of the distribution phenomenon known to the phytogeographer as Jordan's Rule of Geminate Species: the nearest relative of a given species is not found in the immediate region, in this instance Peru, but at some distance from it. From the habitual standpoint these three species of *Symbolanthus* present the tempting suggestion that the genus *Calolisianthus* may be related to the shrub genus *Symbolanthus* through this group. The small flower size (for *Symbolanthus*) and the position of the flowers which are borne among the terminal leaves of the branchlets further support this suggestion.

5. *Symbolanthus mathewsii* (Griseb.) Ewan, comb. nov.

Lisyanthus mathewsii Griseb. Gen. et Sp. Gent. 361. 1839. Type: A. Mathews, "provincia Chacapoyos," Peru. Grisebach adds the phrase "a. 1836" after the citation of collector but though this might be construed as a collection number I am inclined to interpret it as "A(gust) 1836." Though Weberbauer⁴ does not account for Andrew Mathews's collections for the year 1836 specifically, beyond a general reference to his serious illness during this period, it is known that he botanized about Chacapoyos both before and after that date. The duplicate type in the Delessert Herbarium (cf. Field Museum photo 26837) carries a ticket "No. 1316," and this may actually represent Mathews's collection number.

This is a showy species of *Symbolanthus* and may represent what Gilg⁵ proposed as *Symbolanthus obscure-rosaceus*, based on Weberbauer 4634 from the mountains north of Moyobamba, Dept. Loreto, Peru, but this and other details must await the opportunity to study a larger series of collections than I have seen.

6. *Symbolanthus stuebelii* Gilg

This species was described from the Llanos de San Martín, Meta, Colombia, where it was collected by the geographer A. Steubel in August, 1868. It is evidently a rare transandean species, showing again the high endemism of the Colombian flora, and I have seen only a single subsequent collection: Quetame, Dept. Cundinamarca, July, 1916, *M. T. Dawe* 322 (US). Though in different political provinces of Colombia these two localities are in the same vegetation type, namely, the woodlands along the margins of the llanos.

7. *Symbolanthus superbus* Miers

This Colombian species was described from the valley of the Rio

⁴El Mundo Vegetal de los Andes Peruanos 9-10. 1945.

⁵Fedde, Rep. Nov. Sp. 2:56. 1906.

Magdalena and illustrated^a as having the calyx lobes equal, strongly ribbed, oval, all the lobes rounded at the tips, but six Colombian collections studied all show the calyx lobes to be from long-acuminate or even cuspidate to at least distinctly acute. From this data it would appear that the drawing by Miers was drastically conventionalized.

Representative collections: Colombia: Antioquia: Santa Elena, 1500-2000 m., *Archer* 1287 (US). Santander: Mesa de los Santos, 1500 m., *Killip & Smith* 15126 (US), 15133 (US); betw. Piedecresta and Las Vegas, 2000-2500 m., *Killip & Smith* 16170 (US). Amazonas: "trapezio amazonico," betw. Amazon and Putumayo watersheds, 100 m., *Schultes* 6582A (US); Rio Igaraparana, los alrededores de La Chorrera, ca. 180 m., *Schultes* 3915 (US).

The distribution of *Symbolanthus superbus* falls into a pattern noticed for Colombian Scrophulariaceae by the late Dr. F. W. Pennell, namely that species of the Magdalena Valley reappear about the headwaters of the Amazon in small localized areas along watercourses.

^aJour. Bot. 7:218. pl. 94. 1869.

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TAXONOMIC NOTES ON THE LAUGHING GULL

BY KENNETH C. PARKES

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Noble demonstrated (Bull. Mus. Comp. Zool., 60, 1916:367) that the Laughing Gulls (*Larus atricilla*) of the West Indies were substantially smaller in size than those of the North American continent. From the synonymy of the species he selected for the continental population the name *Atricilla megalopterus* Bruch (Journ. für Orn. 3, 1855:287). Bruch's type specimen was said to have come from Peru, where the Laughing Gull is an uncommon species, appearing only under certain conditions of water temperature based on movements of the coastwise currents (Murphy, Oceanic Birds of South America, 1936:1072-1073). A Laughing Gull taken in Peru could have derived from either the continental or the Antillean population. Since there are a number of inconsistencies in Bruch's original description, it was felt that a reexamination of the type of *Atricilla megalopterus* was imperative. Unfortunately the identity of this specimen can never be settled. I was informed by Drs. Erwin Stresemann (letter of October 27, 1951) and Joachim Steinbacher (letter of November 20, 1951) that the entire bird collection of the museum at Mainz, including all of Bruch's types, was destroyed by an air raid on February 27, 1945. It thus becomes necessary to fall back on the principle of the first reviser and assume that Noble correctly fixed Bruch's name upon the continental population of the Laughing Gull.

Of the authors who have written of *Larus atricilla* since the appearance of Noble's paper, only Oberholser (La. Dept. Conserv. Bull. 28, 1938: 286) has supported the proposed subspecific division. Recognition of *megalopterus* was refused by Ridgway (U. S. Nat. Mus. Bull. 50, part VIII, 1919: 636, 641), Dwight (Bull. Am. Mus. Nat. Hist., 52, 1925: 266-267), Wetmore (Sci. Surv. Porto Rico and Virgin Is., 9, 1927: 378-379), Peters (Birds of the World, 2, 1934: 321), and Hellmayr and Conover (Field Mus. Nat. Hist. Zool. Ser. 13, part 1, No. 3, 1948: 275). None of these authors presented tables of comparative measurements to support their views. Wetmore and Swales (U. S. Nat. Mus. Bull. 155, 1931: 174) showed that wing measurements of West Indian specimens fell into two groups, with ranges of 293 to 305 mm. and 312 to 331 mm. respectively. Nevertheless these authors felt that "there is however no

MEASUREMENTS IN MILLIMETERS OF ADULT MALE LAUGHING GULLS
(The writer's measurements combined with those of Noble. See text.)

		WING (Flattened)													
		291- 295	296- 300	301- 305	306- 310	311- 315	316- 320	321- 325	326- 330	331- 335	336- 340	341- 345	346- 350	351- 355	356
ANTILLEAN		6	4	4	2	1	2								
CONTINENTAL						3	5	7	8	4	3	1			1

(NOTES—wing measurements have been grouped into classes to conserve space. Certain Antiguan specimens in the National and Chicago Museums were prepared in a way which precludes the taking of any wing measurements.)

TARSUS

		40	40.5	41	41.5	42	42.5	43	43.5	44	44.5	45	45.5	46	46.5	47	47.5	48	48.5	49	49.5	50
ANTILLEAN																						
CONTINENTAL			4	1	1	2	3	5	1	4	2	3		2	1							

TAIL

		115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130	131	132	133	134
ANTILLEAN																					
CONTINENTAL			1	3	2	6	3	1	3	2	1	1	1	1							

					1	1	2	6	5	3		2	1	2	2	3	2	2			
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definite break between the two so that there is no clear support of the contention that there is a North American continental race distinguished by larger size, particularly since some of the large birds from the West Indies and the Bahamas are taken at dates when migrants should have retreated north to their nesting grounds." Their measurements as published were not segregated by sex or season.

For the present study, all of the Laughing Gulls in the collections of the American Museum of Natural History, the Chicago Natural History Museum, the United States National Museum, and Cornell University were examined. Measurements were made of adult birds in breeding plumage taken during the breeding season. It became apparent early in the study that there is a significant sexual difference in size in this species. Because of time limitations, attention was focussed thereafter on males. My measurements coincide remarkably well with those of Noble, whose 22 specimens did not include any of those I measured. The most significant measurements, in decreasing order of importance, were found to be those of the flattened wing, tarsus and tail. Frequency distributions of the combined measurements are given on the accompanying table, and show graphically the difference in size between these two populations. Although there is some overlap, an individual specimen is seldom intermediate in all measurements. Thus, the individual with the longest wing among the Antillean specimens examined measured 328 mm., which is within the limits of the continental race. However, this individual had a tarsus measuring only 44 mm., smaller than the smallest mainland bird but about average for the West Indian population.

In view of the measurement differences shown in the table, I am of the opinion that Noble and Oberholser were justified in their recognition of two subspecies of the Laughing Gull. For the reasons given in the first paragraph of this paper, the names of the two subspecies will stand as follows:

Larus atricilla atricilla Linnaeus, Syst. Nat., 10th ed., 1, 1758: 136 (Bahama Islands). Antillean Laughing Gull.

Larus atricilla megalopterus (Bruch). From *Atricilla megalopterus* Bruch, Journ. für Orn., 3, 1855: 287 (Peru). Northern Laughing Gull.

PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON

A NEW NAME FOR THE JAMAICAN BAT
MOLOSSUS FULIGINOSUS GRAY

BY DAVID H. JOHNSON
United States National Museum

The name *Molossus fuliginosus* W. Cooper (Ann. New York Lyceum Nat. Hist., vol. 4, p. 67; November, 1837), which was applied to a bat from Milledgeville, Georgia, of the species currently known as *Tadarida cynocephala* (Le Conte), invalidates the name *Molossus fuliginosus* proposed by Gray in February, 1838, for a different kind of bat from Jamaica. This fact was recognized in 1914 by G. M. Allen, who considered the Jamaican bat to be identical with the Hispaniolan *Molossus verrilli* of J. A. Allen (Bull. Amer. Mus. Nat. Hist., vol. 24, p. 581; September 11, 1908), hence not in need of a valid name. In 1913, however, Miller had published a revision of the genus *Molossus* in which he recognized differences between the type of *verrilli* and the thirteen specimens from Jamaica then in the U. S. National Museum collection. Apparently overlooking the fact that Gray's name was preoccupied, Miller continued to use it for the Jamaican form, and subsequent authors have followed his example.

A new name is here provided as a substitute for *Molossus fuliginosus* Gray, with a list of the principal technical citations that apply to the older name.

***Molossus milleri*, new name**

1838. *Molossus fuliginosus* Gray, Mag. Zool. & Botany, vol. 2, no. 12, p. 501; February. (Based on material in the British Museum; locality unknown.)
1839. *Mol[ossus] fuliginosus* Gray, Ann. Nat. Hist., vol. 4, no. 21, p. 7; September.
1843. *Molossus fuliginosus* Gray, List of the specimens of Mammalia in the collection of the British Museum, p. 35. (Three specimens listed, from Bermuda, Jamaica, and Porto Bello.)
1851. *Molossus fumarius* (part), Gosse, A naturalist's sojourn in Jamaica, p. 293.
1861. *Molossus fumarius* (part), Tomes, Proc. Zool. Soc. London, 1861, p. 68; May.
1865. *Molossus fumarius* (part), Osburn, Proc. Zool. Soc. London, 1865, p. 79; June.

1877. *Molossus obscurus* (part), Dobson, Proc. Zool. Soc. London, 1876, p. 710; April.
1878. [*Molossus rufus*] Var. a (*Molossus obscurus*) (part), Dobson, Catalogue of the Chiroptera in the collection of the British Museum, pp. 412-413. (Specimen from Jamaica selected as type of *fuliginosus*.)
1893. *Molossus obscurus* (part), Cockerell, Jour. Inst. Jamaica, vol. 1, no. 6, p. 261; April.
1897. *Molossus obscuris* [sic] (part), Anonymous [P. W. Jarvis ?], Jamaica Post (newspaper), July 6, 1897.
1897. *Molossus rufus obscurus* (part), Trouessart, Catalogus mammalium tam viventium quam fossilium, fasc. 1, p. 143.
1904. [*Molossus rufus*] *obscurus* (part), Elliot, Publ. Field Columbian Mus., Zool. Ser., vol. 4, pt. 2, p. 620.
1907. *Molossus rufus obscurus* (part), Elliot, Publ. Field Columbian Mus., Zool. Ser., vol. 8, p. 522; March 4.
1913. *Molossus fuliginosus*, Miller, Proc. U. S. Nat. Mus., vol. 46, p. 90; August 23.
1914. *Molossus verrilli* (part), G. M. Allen, Bull. Mus. Comp. Zool., vol. 54, p. 248; July.
1924. *Molossus fuliginosus*, Miller, U. S. Nat. Mus. Bull. 128, p. 89.
1951. *Molossus fuliginosus*, Koopman & Williams, Amer. Mus. Novitates, no. 1519, p. 19; June 6.

Molossus milleri is intended to be wholly synonymous with Gray's *Molossus fuliginosus*, taking the same type specimen and type locality. The Jamaican specimen designated lectotype by Dobson is presumably still in the British Museum. The new name is suggested in honor of Gerrit S. Miller, Jr., former Curator of Mammals in the United States National Museum, the author of "The Families and Genera of Bats," and the latest reviser of the genus *Molossus*.

In using a binomial rather than a trinomial form I am aware that, when viewed by present concepts of the relative values of species and subspecies, many of the kinds of *Molossus* are more closely related than Miller's revision of nearly forty years ago would indicate. The next reviser of the genus may treat many of Miller's Antillean "species" as geographic races of a few widely ranging species. Until a revision based on study of specimens has been completed, however, it is surely bad taxonomic procedure to attempt to anticipate its conclusions.

PROCEEDINGS
OF THE
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A NEW HARE (*LEPUS ARCTICUS*) FROM NORTHERN CANADA

BY CHARLES O. HANDLEY, JR.
United States National Museum

A small series of hares from Prince Patrick Island in the Canadian Arctic Archipelago reveals the presence there of an undescribed race of *Lepus arcticus*. I take pleasure in naming it in honor of the late Charles J. Hubbard, former Chief of the Arctic Section, U. S. Weather Bureau, whose whole-hearted cooperation and interest made possible extensive biological studies and collections in Arctic America. For the loan of comparative material I am grateful to the National Museum of Canada.

Lepus arcticus hubbardi, subsp. nov.

Type.—U. S. National Museum No. 290933; adult male, skin and skull; collected 11 June 1949, by Charles O. Handley, Jr., at 350 feet elevation, near Cherie Bay, 5 miles NE of Mould Bay Station, Prince Patrick Island, District of Franklin, Northwest Territories, Canada (76° 20' N. lat., 119° 08' W. long.); collector's No. 1283.

Distribution.—Known only from Prince Patrick Island, Northwest Territories, Canada; probably inhabits other islands to the east and northeast. Zonal range, Arctic.

Description.—Adult summer pelage: Predominantly white in most specimens; tip of ear black; posterior inner and anterior outer surfaces of ear pinkish-buff, remainder of inner and outer surfaces and narrow subterminal band white; nose, cheeks, and top of head pale pinkish-buff; other parts of body, feet, legs, and tail pure white, or with a sprinkling of gray guard hairs on upper back, sides, and throat. Adult winter pelage: Entirely white, except for black on tips of ears. Juvenal summer pelage: Top of head and ears yellowish-brown; ears black-tipped; remainder of body, legs, and feet pale pinkish-gray, lighter than head and ears; tail white. Size large; tail long. Skull large; premaxillae greatly elongated; first upper incisors long and with a large radius of curvature; nasals long and wide; maxillary molars large and tooth row long.

Measurements.—Eight adults, including type, from vicinity of type locality (measurements taken as outlined by Howell, Jour. Mammalogy 17: 318, 1936; all in millimeters, averages followed by extremes): Total length, 626 (596-656); tail vertebrae, 100 (94-107); hind foot, 158 (155-170); ear from notch, 88 (85-92); greatest length of skull, 110.7 (108.4-113.0); basilar length, 80.6 (78.2-82.6); diagonal length of nasals, 42.8 (41.3-44.5); greatest width of nasals, 22.2 (20.3-24.5); depth of

rostrum, 25.3 (23.9-27.1); cranial breadth, 35.6 (34.4-36.7); zygomatic breadth, 51.1 (49.4-52.5); maxillary tooth row, 20.2 (19.0-21.0).

Comparisons.—*Lepus arcticus hubbardi* is the largest and most prognathous of all the Eastern American Arctic hares. It is closely related to *L. a. monstrabilis*, which it resembles in most respects. However, *hubbardi* averages less white in summer pelage, it is larger and longer-tailed, its skull averages slightly larger in all dimensions (but disproportionately larger in nasals and molars), and its incisors have a greater radius of curvature. The first upper incisor of *hubbardi* forms the arc of a circle the radius of which averages 21.6 mm.; the corresponding measurement for *monstrabilis* is 19.3 mm. The new subspecies is quite different from *L. a. andersoni*, which, though heavier in body and skull, is smaller in most linear dimensions, is much less prognathous (radius of curvature of upper incisor 13.9 mm.), and is dark gray rather than white or whitish in summer pelage.

Specimens examined.—Vicinity of Mould Bay, Prince Patrick Island, N. W. T., Canada, 12 (Nat. Mus. Canada, 3; U. S. Nat. Mus., 9).

PROCEEDINGS
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NOMENCLATURAL NOTES ON THE SCAPHOPOD MOLLUSCA:
THE TYPE SPECIES OF *FUSTIARIA* AND *PSEUDANTALIS*¹

BY WILLIAM K. EMERSON²

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A number of nomenclatural problems were encountered by the writer during the preparation of a manuscript pertaining to the type species of the genera and subgenera which comprise the molluscan class Scaphopoda. The purpose of this paper is to outline the nomenclatural history and indicate the genotype species of the "subgenera," *Fustiaria* and *Pseudantalis*.

FUSTIARIA Stoliczka, 1868

Stoliczka (1868:439) proposed *Fustiaria*, without designating a type species, for *Dentalium eburneum* Lamarek (1818:346), *D. circinatum* Sowerby (1823:f.5), and "others figured by Sowerby [1823] in his 'Genera of Shells,' by Deshayes [?1864] in his last edition of the 'Paris Fossils'." He provided the following description, "shell tubular, thin, usually slightly curved, smooth, posterior end with a long, linear slit on or near the ventral side." Stoliczka appears to have intended this group to include all species possessing a long, straight cleft on the convex face. However, with the exception of his citation of Sowerby and Deshayes' figures of *D. circinatum* and *D. eburneum*, no reference was made to forms possessing encircling grooves which divide the surface into many narrow segments. Since such an annular striate species, *D. circinatum* Sowerby (here illustrated pl. IX, fig. 1) was contained in the original list of species, Cossmann (1888:9) and subsequent writers have justifiably expanded the original concept of the group to include both smooth and annulated species which have the long linear mid convex slit.

The designation of "*Dentalium eburneum* Linnaeus, *Systema Naturae*, 1767" by Newton and Harris (1894:64) appears to be the earliest genotype designation. It should be noted that Stoliczka (1868:439) credited *D. eburneum* to Lamarek, not Linné; Lamarek (1818:346) in turn listed in the synonymy of his *D. eburneum* a reference to Linné (1767:1264) and considered his *D. eburneum* identical with the Linnaean species. Most subsequent writers, including Pilsbry and Sharp (1897: 116), have followed this interpretation. On the basis of the foregoing, this designation apparently should be considered as being valid. How-

¹Contribution no. 68 from the Allan Hancock Foundation, The University of Southern California.

²Formerly, Research Fellow, the Allan Hancock Foundation.

ever, Dr. N. H. Ludbrook³ kindly informed the writer that Favre (1912: 346) found Lamarck's specimens of "*D. eburneum*" contained in the Museum d'Histoire Naturelle de Genève to be actually the Grignon Eocene fossil, *D. subeburneum* d'Orbigny (1850:372), here illustrated pl. IX, fig. 4. Dr. Ludbrook personally examined this material and substantiated Favre's earlier findings. The validity of the designation thus becomes open to question. It should be noted that under the Régles in effect prior to 1951, Opinions 65 and 168 might be interpreted as validating the above designation, and this situation is apparently similarly covered in the revised Régles,⁴ which unfortunately are not at the time of this writing in print.

The acceptance of *Dentalium eburneum* as the type species would be an unfortunate choice as considerable confusion exists concerning the true identity of this species and would necessitate changing the current concept of the subgenus. An examination by Hanley (1855) of the Linnaean collection deposited in the Linnaean Society of London disclosed that the holotype is Recent and that the fossil "*D. eburneum*" specimens of most nineteenth century authors writing before 1855 are referable to *Dentalium politum* Linné (1767:1264) from the Eocene of the Paris Basin.⁵ On the basis of Stoliczka's citation of figures, his reference to "*Dentalium eburneum*, Lamck." undoubtedly refers to a fossil, either *D. politum* Linné, 1767, or more probably *D. subeburneum* d'Orbigny (1850:372) from the Paris Basin Eocene. Nevertheless, *D. eburneum* Linné (1767:1264) here illustrated, pl. IX, fig. 6, is a Recent species which has numerous, unequal, irregularly spaced, annular wrinkles, and lacks the long, linear slit which characterizes the fossil species, e.g. *D. lucidum* Lamarck, 1818 and *D. circinatum* Sowerby, 1823, here illustrated, pl. IX, figs. 1, 5.

If the type designation of Newton and Harris (1894:64) is accepted as the earliest valid designation, a new subgeneric name would have to be proposed for the *Fustiaria* group of authors. Under this interpretation the name *Fustiaria* would be, of necessity, restricted to the Recent species, *Dentalium eburneum* Linné, *D. philippinarum* Sowerby (1860: 98) here illustrated, pl. IX, fig. 7, and possibly *D. siculum* Pilsbry and Sharp (1897:107).

Rather than change the generally accepted, and apparently the original, concept of *Fustiaria*, the writer believes it would be advantageous to consider the designation of Newton and Harris to be invalid because Stoliczka's original list of species assigned to *Fustiaria* did not include *Dentalium eburneum* of Linné. Under this interpretation, the validation of the genotype species would date from the next available designation. In addition to Newton and Harris (1894:64), Cossmann (1888:9) and Sacco (1897:112) invalidly designated *Dentalium politum* Linné (1767:1264) the genotype. Following Cossmann's (1888:9) expanded concept of the subgenus, Pilsbry and Sharp (1897:127) validly designated *D. circinatum* Sowerby (1823:f.5) the genotype species. The writer proposes that the designation of Pilsbry and Sharp be accepted

³In *Uteris*, 1952.

⁴See Moore, R. C., p. 14, 1950.

⁵Recent specimens also have been referred to this species by a number of writers.

as the first available designation with *Dentalium circinatum* Sowerby (1823) here illustrated, pl. IX, figs. 1, 3, the genotype species.

PSEUDANTALIS Monterosato, 1884

Monterosato (1884:32) proposed *Pseudantalis* without designating a genotype for a heterogenous group of species, namely: *Dentalium fissura* Lamarek (=subgen. *Fustiaria*), *D. inversum* Deshayes (=subgen. *Graptacme*), *D. rubescens* Deshayes (=subgen. ?*Laevidentalium*), *D. tenuifissa* Monterosato (=subgen. *Fustiaria*), and *D. filum* Sowerby (=subgen. *Episiphon*). Pilsbry and Sharp (1897:127), following the usage of Fischer (1885:894) and Cossmann (1888:9), placed *Pseudantalis* in the synonymy of *Fustiaria* Stoliczka (1868:439), but did not designate a type species. Subsequently, Pilsbry (1939:139), remarked, "*Pseudantalis* Monterosato, Nom. Gen. e Spec. Conch. Medit., p. 32, (1884) was proposed for several species but without designation of type," and completed his note by stating, "*P. rubescens* (*Dentalium rubescens* Desh.) is to be taken as genotype." Approximately eight years later Pilsbry (1947:31) commented in another note, "[the] type of *Pseudantalis* Monterosato, 1884, . . . was not stated in original publication, and I believe not elsewhere. *Dentalium fissura* Lamarek is now [here] designated type."

Sacco's (1897:111) designation of "*P.[seudantalis] rubescens* Desh. [ayes]" as the genotype species of "Sottog. *Pseudantalis* Montrs. 1884" apparently is the earliest available designation. This species, on the basis of its apparent lack of a long, medial apical slit, is generally assigned to the "subgenus" *Laevidentalium* Cossmann (1888:7), genotype by original designation: *Dentalium incertum* Deshayes (1825:362), here illustrated: pl. IX, fig. 9. If the two units were considered to be synonymous, *Pseudantalis* (1884) would be a senior subjective synonym of *Laevidentalium* (1888). This interpretation would constitute an unfortunate nomenclature change as *Laevidentalium* is commonly used for most members of the Dentaliidae which possess a smooth, non-sculptured shell surface.

Fortunately, there appears to be justification for the allocation of *Dentalium rubescens* to the subgenus *Fustiaria*; thus retaining the generally used concept of *Pseudantalis* as a junior subjective synonym of *Fustiaria*. Monterosato (1884:32-33) and Boissevain (1906:60), have pointed out that the apical features of *D. rubescens sensu lato* vary considerably among individuals from the same population. As described by Deshayes (1825:363), the "typical" form of this species is characterized by the possession of a long internal groove which usually terminates at the apical rim in a small sub-triangular notch see pl. IX, fig. 8. In other specimens a long, narrow, medial slit cuts the convex surface of the posterior portion of the tube, see pl. IX, fig. 11. In some individuals, the apical slit is not continuous, being blocked by a closure in the slit, see pl. IX, fig. 12. Monterosato (1884:33) recognized the diversity of the apical features and proposed the name *tenuifissa* to distinguish the fissured form. Due to a scarcity of specimens for comparison, most subsequent authors, including Pilsbry and Sharp (1897:107, 129) and Boissevain (1906:59-60), provisionally assigned Monterosato's fissured form, "*D. tenuifissa*," to the subgenus *Fustiaria* and placed

the externally unslit form, *D. rubescens*, in the "subgenus" *Laevidentium*.

On the basis of the available data, *D. tenuifissa* appears to represent nothing more than an infrasubspecific form of the *D. rubescens* species complex. The writer proposes that the generally accepted concept of *Pseudantalis*, be retained by allocating the apparent genotype species, *D. rubescens* Deshayes, to the subgenus *Fustiaria*. Under this interpretation, *Pseudantalis* would continue as a junior subjective synonym of *Fustiaria*.

It should be noted that the development of polymorphic apical characters in the species comprising the subgenus *Fustiaria* considerably reduces the biological significance of this "subgeneric unit." It is quite evident that the higher categories of the Dentaliidae require a thorough re-evaluation in the light of present knowledge. Such an evaluation is beyond the scope of this paper.

CONCLUSION

On the basis of the data presented above, *Pseudantalis* (genotype: *Dentalium rubescens* Deshayes, 1825) is a junior subjective synonym of *Fustiaria* (genotype: *Dentalium circinatum* Sowerby, 1823).

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The writer is indebted to Dr. L. G. Hertlein of the California Academy of Sciences, Dr. N. H. Ludbrook, and Dr. W. J. Rees of the British Museum of Natural History for providing data, specimens, or aid in the completion of this paper.

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EXPLANATION OF PLATE

- Fig. 1 *Dentalium circinatum* Sowerby, 1823, after Sowerby 1823, fig. 5.
- 2 *Dentalium subeburneum* d'Orbigny, 1850, p. 216, after Sowerby 1823, fig. 6, as *D. eburneum*.
- 3 *Dentalium circinatum* Sowerby, 1823, after Deshayes 1866, pl. 2, fig. 10; enlargement of convex face showing the medial slit.
- 4 *Dentalium subeburneum* d'Orbigny, 1850, Grignon, Paris Basin Eocene.
- 5 *Dentalium circinatum* Sowerby, 1823, Grignon, Paris Basin Eocene.
- 6 *Dentalium eburneum* Linné, 1767, after Boissvain 1906, from Sowerby 1860, pl. 225, fig. 53.
- 7 *Dentalium philippinarum* Sowerby, 1860, after Sowerby 1860, pl. 225, fig. 54.
- 8 *Dentalium rubescens* Deshayes, 1825, after Deshayes 1825, pl. 16, fig. 24; enlargement of apical portion showing notch.
- 9 *Dentalium incertum* Deshayes, 1825, after Deshayes 1866, pl. 1, fig. 26.
- 10 *Dentalium rubescens* Deshayes, 1825, after Deshayes 1825, pl. 16, fig. 23. (This figure is inadvertently marked 0 instead of 10 on the plate.)
- 11 *Dentalium rubescens forma tenuifissa* Monterosato, 1884; Recent, enlargement of apical portion showing slit.
- 12 *Dentalium rubescens forma tenuifissa* Monterosato, 1884; Recent, enlargement of apical portion showing slit.



Plate X

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New names are printed in heavy type.

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